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MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
ANTHROPOLOGY AT THE CHICAGO MEETING

THE joint meeting of Section H of the American Association for the Advancement of Science, the American Anthropological Association and the American Folk-Lore Society was held at the University of Chicago, Chicago, December 30, 1907, to January 2, 1908.

MEETING OF THE SECTIONAL COMMITTEE

Professor Boas, vice-president of Section H, presided over the sectional committee meeting, other members present being Miss Alice C. Fletcher and Dr. George Grant MacCurdy, acting secretary. Officers for the Chicago meeting were nominated as follows:

Member of the General Committee—Professor Frederick Starr.

Member of the Council—Miss Fletcher.

Sectional offices were filled by the nomination of Professor R. S. Woodworth, Columbia University, New York, as vice-president for the ensuing year and of Professor Roland B. Dixon as member of the sectional committee to serve five years. These nominations were later approved by the association in general committee.

COUNCIL MEETINGS OF THE AMERICAN ANTHROPOLOGICAL ASSOCIATION

Professor Boas as president of the association likewise presided over the deliberations of the council. Members of the council present in addition to the president

were: Miss Fletcher, Charles Peabody, G. A. Dorsey, E. L. Hewett, R. B. Dixon, B. T. B. Hyde and G. G. MacCurdy.

The secretary, Dr. George Grant MacCurdy, reported that there had been no special meeting of the association since the beginning of the year; but a meeting of the council was held at Yale University Museum, October 11, in the interest of the program for the Chicago meeting. Those present were, Professor Boas, chairman, Professor Saville, Dr. Peabody and Dr. MacCurdy, secretary. There was also a meeting of the committee on program in New York on November 18.

The responsibility for the Chicago joint meeting having been left in Dr. MacCurdy's hands by the secretaries of Section H and of the American Folk-Lore Society, a call for the meeting was mailed in October to the more than 700 members of the three societies.

In response to this call thirty-nine titles were received. A preliminary program was prepared and mailed to members December 14. In addition all abstracts that reached the secretary in time to be submitted for approval were printed (fifteen in number) and were distributed on the opening day of the meeting.

Among the social functions arranged for the benefit of the anthropologists was a reception on the evening of January 1 by Dr. and Mrs. Geo. A. Dorsey at their home, 5609 Monroe Avenue.

ADDRESSES AND PAPERS

Professor Boas's address as president of the American Anthropological Association was on "Anthropology as a Subject of University and College Instruction." It will not be published at present.

The address of the retiring vice-president, Dr. A. L. Kroeber, which was read by title in the absence of the author, was printed in SCIENCE of February 21.

The president of the American Folk-Lore Society, Professor Roland B. Dixon, chose for his subject "Some Aspects of the American Shaman." The Shaman was considered in the making, in regard to functions and activities as healer, sorcerer, seer, priest and educator, in relation to the degree of organization, and as regards his position in and influence on the community. The geographical distribution of several features connected with the Shaman was briefly considered, and some of the characteristics of American shamans, as opposed to those of other regions, were pointed out.

Brief abstracts of the papers read are given in so far as material at the disposal of the secretary will permit.

Professor Roland B. Dixon read a paper on "The Chimariko Language." A few of the more characteristic features of the language were considered and compared with the types found in neighboring languages. The question of loan words from surrounding stocks is briefly discussed, as were also one or two phonetic traits.

Dr. Alfred M. Tozzer presented two papers. The first of these was "On the Teaching of Anthropology to Large Classes." He discussed the character of a general course in anthropology, taking "Anthropology 1" at Harvard as an example. Requirements for entrance; composition of the class; difficulties peculiar to a large class, and how these difficulties are met; aids in conducting the course, and results were all touched upon. In "A Note upon Star-Lore among the Navajos," Dr. Tozzer emphasized the keen powers of observation of the Navajos as seen in the case of a gourd rattle which is used in connection with the "night chant" ceremony. Holes made in the rattle have been identified as representing stars which are seen in the month of the year in which the

ceremony takes place and in the particular part of the sky towards which the special rites of the day are directed. The stars thus seen are supposed to represent certain gods of the tribe.

In "A Number-Form from Folk-Medicine," Professor Charles Bundy Wilson presented a peculiar combination of numbers occurring in a remedy for rheumatism, which was discovered by the writer when gathering material for a paper on folk-medicine. The application of the remedy calls for three series of doses of three doses each. When the numbers of units in these doses are arranged in regular form, the sums of the vertical, horizontal and diagonal columns present interesting results, particularly with reference to 13 and 3.

Professor Francis W. Kelsey's paper on "Some Archeological Forgeries from Michigan" was accompanied by photographs and specimens illustrating the forgeries of 1891–92, 1898 and 1907, respectively. The three series include objects of clay, copper and slate, decorated for the most with bogus hieroglyphics. The jumble of ancient Oriental writing was explained as due to the composite character of a colony, Egyptians and Phœnicians as well as Assyrians, which in a remote period found its way from the drainage area of the Euphrates and Tigris across seas, up the St. Lawrence and the Lakes to Michigan. The distributing center of these forgeries[1] during the past year has been Detroit.

The success that has attended these efforts at imposition—so far as they have been successful—is, Professor Kelsey thinks, almost wholly due to the religious element in several of the designs. These are at the same time self-interpreting and mystifying; and their presence has seemed to turn the attention of many away from consideration of the material and of the crass incongruities in design and technique.

There is no danger that by frauds such as these purchasers for museums will be imposed upon; but it is the duty of the expert to protect so far as possible the amateur collector, not only for his own sake but because he creates the market for archeological remains which without such a stimulus would be neglected or destroyed as of no value and so lost to science.

In "The Prehistoric Habitations of the Sioux" Professor N. H. Winchell called attention to the evidence which indicates that in prehistoric times the well-known form of earthen house of the Mandans was common in Minnesota. This evidence consists of traditions amongst the Ojibwa, the existence of many flat-topped, or concave-topped, low mounds, the persistence of such terms as "Ground House River," coming through the Ojibwa, who expelled the Sioux, found in Kanabec County, the stock alliance of the Sioux with the Mandans and the Hidatsa, as well as with the Omaha, all of whom are known, even in historic time, to have occupied such habitations, and finally some slight historic allusions to houses of this kind.

"Recent Aspects of the Eolithic Discussion" were reviewed by Dr. Charles Peabody, who called attention to Rutot's Tertiary eoliths and to his eolithic series persisting through all ages to and including recent Tasmanian cultures; also to a proposed change in the connotation of "eolithic," "paleolithic," etc. It is proposed to determine whether an eolithic industry may not exist in America.

Dr. Peabody also presented a "Report for the Committee on American Archeological Nomenclature" of which he is chairman. This report has been published and is already in the hands of members of the American Anthropological Association.

[1] It seems a pity that there is at present no legal means of punishing the forgers.

It covers only certain divisions of objects in clay and objects in stone, and is accompanied by sixty-six illustrations. The classifications offered and the definitions proposed are based so far as possible on form alone, due weight being given to systems of classification already made standard by writers of distinction. In all cases measurements are considered as referring to an upward direction.

The variations in the body, rim, neck, foot and handle of a clay vessel are noted. Articles in stone are classified as *chipped* and *ground;* and these two groups are subdivided, with an enumeration of all the types in each subdivision.

The "Report for the Committee on the Preservation of American Antiquities" was prepared and read by Mr. E. L. Hewett, secretary of the committee. Attention was called to the national monuments that have been created during the past year, including Chaco Canyon, Montezuma Castle and others.

Owing to the unsatisfactory nature of the rules and regulations prescribed by the secretaries of the interior, agriculture and war to carry out the provisions of the act for the preservation of American antiquities not much has been done in the way of field work. The Joint Committee on the Preservation of American Antiquities prepared a revision of these rules which was approved by the secretaries of war and of the interior, but the approval of the secretary of agriculture has not yet been secured. This failure to agree on a revision has resulted in the abrogation of the rules, an order from the war department by direction of the president taking their place.

Professor Franz Boas, chairman, reported for the Committee on the Concordance of American Mythology. "Advance Report on the Nomenclature of Indian Linguistic Families" by Mr. F. W. Hodge, chairman of the committee, was printed for distribution and in the absence of the author was read by title.

The paper by Professor W. H. H. Rivers, of Cambridge, England, on "The Genealogical Method in Anthropology" was illustrated by lantern slides. Dr. George A. Dorsey's paper on "Field Work of the Department of Anthropology, Field Museum of Natural History," was supplemented by inspection of the museum collections under the guidance of Drs. Dorsey, Lewis and others. Professor Albert Ernest Jenks presented "Race Statistics of the University of Minnesota" and the Rev. Stephen D. Peet discussed "Migrations as shown by Archeology."

Papers were read by title as follows:

Dr. Walter Hough: "Blow Guns of the Abbott Malaysian Collection in the U. S. National Museum."

Mr. R. Lowrie: "Catchwords for Mythological Motives."

Professor M. H. Saville: (*a*) "The Archeology of Esmeraldas"; (*b*) "Further Investigation of the Archeology of Manabi."

Professor Henry Montgomery: "Recent Archeological Explorations in Western Canada."

Miss Adela Breton: "The Ancient Mexican Sites near Juchipila, Teuchitlan, Zapotlan, Perote and Yoalliche."

Mr. Frederick Monsen: "A Description of Certain Ruins in an Unnamed Canyon in Southeastern Utah."

Dr. Berthold Laufer: (*a*) "The Ancient Culture Types of Asia"; (*b*) "The Cocoanut Palm as a Historical Problem."

Mr. William C. Mills: (*a*) "Explorations of the Seip Mound"; (*b*) "Explorations of Jackson County Rock-shelters."

Mrs. M. Burton Williamson: "The Haliotis, or Abalone Industry of the California Coast: Preservative Laws."

Mr. H. J. Spinden: "The Mythology of the Nez Percé Indians."

Dr. Geo. B. Gordon: (*a*) "Ethnology of the Koskokwin Valley"; (*b*) "Linguistic Variation among the Alaskan Eskimo."

Dr. A. H. Thompson: "Anthropology Past and Present."

Mr. V. Stefansson: (*a*) "Physical Characters

of the Eskimos of the Coast West of Cape Bathurst"; (*b*) "Social Organization and Daily Life of the Mackenzie River Eskimos"; (*c*) "The Treatment of Disease among Mackenzie River Eskimos."

DR. MAXIMILIAN HERZOG: "The Brain Weight of the Filippino."

PROFESSOR OTIS T. MASON: "Mind and Matter in Culture."

DR. SARAH NEWCOMB MERRICK: "A Unique Method for Preserving the Inscriptions in Our Historic Burial Grounds"; (*b*) "Present-day Beliefs in some Medical Superstitions."

GEORGE GRANT MACCURDY
YALE UNIVERSITY,
NEW HAVEN, CONN.

THE GEOLOGICAL SOCIETY OF AMERICA

THE Geological Society of America held its twentieth annual meeting, December 30 and 31, 1907, at the University of New Mexico, Albuquerque, N. M. The attendance was small, of course, as compared with that at the New York meeting, but it was satisfactory and there was time for considerable discussion. About thirty fellows of the society were present, besides other geologists, students and visitors to the number of nearly as many more. Seven members came from the Cordilleran Section, which extends from the Rocky Mountain region to the Pacific coast; five members and three visitors came from eastern Canada, and the remainder were from the eastern half of the United States, five of them being from the Atlantic coast. The local arrangements for the meeting, which were made by President W. G. Tight, of the university, were admirable, and the welcome extended by President Tight and his associates and the citizens of Albuquerque was most cordial and substantial. Furthermore, the Atchison, Topeka and Santa Fé Railway Company made considerable reductions in the rates for tickets, which were appreciated. The meeting was held under the following officers:

President—President C. R. Van Hise, Madison, Wis.

First Vice-president—Mr. J. S. Diller, Washington, D. C.

Second Vice-president—Professor A. P. Coleman, Toronto, Canada.

SESSION OF MONDAY, DECEMBER 30, 1907

President Van Hise presided, calling the meeting to order at 9:15 A.M. The secretary, Dr. E. O. Hovey, of the American Museum of Natural History, reported that the printed list of fellows contained 294 names. During the year the fourteen new fellows elected at the New York meeting qualified; two fellows, Professors Safford and Heilprin, were lost by death, and one was lost by resignation. After the reading of the memorials of the deceased fellows the regular program of papers was taken up as follows:

The Occurrence of Proustite and Argentite at the California Mine near Montezuma, Colo.: FRANK R. VAN HORN, Cleveland, Ohio.

Massive proustite and argentite occur with argentiferous galena and sphalerite in a gangue of siderite and quartz in a fissure vein in gneissoid rocks at the California Mine on Glacier Mountain, about three miles from Montezuma, Summit County, Colorado. The vein generally shows a banded structure, but in places, is more or less brecciated on account of faulting of the region. The chief ore is argentiferous galena, with considerable sphalerite irregularly mixed with it. In some parts of the vein proustite and argentite occur at the center in seams which sometimes have a thickness of two inches. In places the argentite has been reduced to silver.

The paper was discussed by C. R. Van Hise, George D. Louderback and H. E. Gregory.

Field Assay of Mine Waters: Alfred C. Lane, Lansing, Mich.

The theory of ore deposition and circulation by underground waters much needs to be supplemented by tests and analysis of mine waters. Some of the "field assay" methods are applicable, but the presence of calcium chloride makes the sodium acid sulphate test for carbonates inapplicable. It is well to make a preliminary test of the concentration of the water by a hydrometer or by a specially devised total reflectometer. In the stronger mine waters it is often best to add the water to a solution of the reagent.

The following papers were read by title:

The Phosphate Deposits of Florida with Relation to the Underground Water Level: E. H. Sellards, Tallahassee, Fla.

Asbestos Deposits of the Grand Canyon, Arizona: Joseph Hyde Pratt, Chapel Hill, N. C.

Ancient Tectonics of the Basin Ranges: Charles R. Keyes, Des Moines, Ia.

Rock-flora of Intermont Plains of Arid Regions: Charles R. Keyes, Des Moines, Ia.

The next paper read was

Glacial Periods and their Bearing on Geological Theories: A. P. Coleman, Toronto, Can.

Four well-defined glacial periods are known in geological history, occurring in the Pleistocene, the Permo-Carboniferous, the lower Cambrian and the lower Huronian, final proofs of the last-named glacial period having been obtained only recently. The wide distribution of glacial deposits in at least three of these periods proves that refrigeration was general and included both hemispheres. There is evidence of important interglacial periods in three of the ice ages. The importance of these facts as bearing on the origin and early history of the earth and on the factors which cause variations of climate was pointed out.

An active discussion was participated in by W. G. Tight, A. C. Lawson, I. C. White, H. M. Ami, G. K. Gilbert, H. E. Gregory and C. R. Van Hise.

The Chief Features of the Stratigraphy and Structure of Mount Diablo, California: George D. Louderback, Berkeley, Cal.

Mount Diablo is a distinctive feature of the central coast ranges because it rises from low valleys on practically all sides and is not merely a more prominent peak of a continuous range. It shows a remarkably complete stratigraphic series of the characteristic Coast Range formations. Structurally it is an overturned and overthrust anticline of very late origin. There is also evidence of an earlier structural form. The geology of Mount Diablo may be taken as showing a stratigraphic succession and an orogenic history characteristic of the coast ranges from the Klamath Mountains to the Tehachapi.

The paper was discussed by A. C. Lane, A. C. Lawson and H. P. Cushing.

The following papers were then read by title:

The Earthquake in Owens Valley, California, in 1872: William Herbert Hobbs, Ann Arbor, Mich.

Beginning and Recession of Saint Anthony Falls: Frederick W. Sardeson, Minneapolis, Minn.

The "Nebraska Loess Man": B. Shimek, Iowa City, Iowa.

The Distribution of Drumlins and its Bearing on their Origin: Frank. B. Taylor, Fort Wayne, Ind.

The Cirques and Rock-cut Terraces of Mt. Tobey, Mass.: B. K. EMERSON, Amherst, Mass.

The next paper was

The Lower Portion of the Paleozoic Section in Northwestern New York: H. P. CUSHING, Cleveland, Ohio.

In Jefferson County, N. Y., in the district between Watertown and Alexandria Bay, the Potsdam sandstone and the Lowville, Black River and Trenton limestones are present in quite normal expression. Between the Potsdam and the Lowville are two additional formations. The lower of these passes into the Potsdam by gradation and is lithologically like similar "passage beds" elsewhere in northern New York. It consists of alternating sands and sandy dolomites, varies in thickness from 15 to 75 feet, and has an erosion unconformity at its summit. It is overlain by an impure limestone formation which overlaps on the district from west to east, reaches a thickness of 125 feet, and holds a fauna not hitherto noted in New York, which is tentatively correlated by Dr. E. O. Ulrich with that of the upper Stones River formation of southern Pennsylvania. It has close relationship to the Lowville formation above. The Chazy formation is absent, as is also the entire Beekmantown. The physical break between the two formations is the most prominent one as yet noted in the New York Lower Silurian. The section was compared with those east and south of the Adirondacks, and the additional light which it throws on the physical oscillations of the region was considered. Discussed by H. M. Ami.

At 12:15 o'clock the society adjourned for luncheon in the dining room of the university, after which President Tight led the way to the flat roof of one of the pueblo-style dormitories, from which he pointed out the geological features of the surrounding country.

At 2 o'clock the afternoon session began with the reading of the annual address by the retiring president, President Charles R. Van Hise, of the University of Wisconsin, who chose as his subject "The Problem of the Pre-Cambrian." By request of the president, his address was thrown open to discussion, and remarks were made by A. C. Lane, A. C. Lawson, A. P. Coleman, H. M. Ami and C. R. Van Hise.

The following papers were then read by title:

The Red Sandstone Formation of Southeastern Minnesota: C. W. HALL, Minneapolis, Minn.

The Geological History of the Redstone Quartzite: FREDERICK W. SARDESON, Minneapolis, Minn.

Geology of a Portion of Central Wyoming: N. H. DARTON, Washington, D. C.

Some Features of the Geology of Arizona and Western New Mexico along the Santa Fé Railroad: N. H. DARTON, Washington, D. C.

After this the society listened to the reading of a paper on

Grenville-Hastings Unconformity: WILLET G. MILLER and CYRIL W. KNIGHT, Toronto, Canada.

The crystalline limestone and associated pre-Cambrian sedimentary rocks of southeastern Ontario and the adjacent parts of the province of Quebec, to which Logan and his colleagues long ago gave the names of Grenville and Hastings series, have never been satisfactorily classified as regards their age. Recent work by the present writers has shown that much at least of what has been called the Hastings series, consisting of limestones, conglomerates and other fragmental rocks, is much younger than, and forms a well-defined unconformable series with, the typical crystalline

limestones and associated fragmental rocks of what has been called the Grenville series proper. The view that the Grenville and Hastings constitute one series, the former being a more highly altered phase of the latter, is no longer tenable.

The writers find the Keewatin series of the Lake Superior region represented in southeastern Ontario by ancient rocks of like character. The Grenville limestones have been deposited on the surface of the Keewatin. The writers class the Grenville limestone as regards age with the Keewatin iron formation of Lake Superior, which it has not been found possible in that region to separate from the greenstones. The pre-Cambrian conglomerate and associated sedimentary rocks overlying, unconformably, the Grenville limestone, are classed as Huronian. The conglomerate contains not only ordinary fragments of the Grenville limestone, but "eozoon"-like boulders as well, thus showing that the limestone is much older than the conglomerate. Moreover, the "pebbles of cherty and ferruginous rocks resembling those found in the iron ranges of Lake Superior" in the conglomerate of eastern Ontario are found by the writers to have been derived from layers or bands of this material in the Grenville limestone.

The paper was read by Mr. Miller and the discussion was participated in by A. P. Coleman, H. P. Cushing, C. R. Van Hise, A. C. Lane and W. G. Miller.

The next paper was

Relation of the Equus Beds of Kansas to Reversed Mississippi Drainage: W. G. Tight, Albuquerque, N. M.

Discussed by A. P. Coleman, H. E. Gregory, A. C. Lane and F. W. Cragin.

The following two papers were read without intermission by Dr. A. C. Lane:

A New Siluric Fauna from Michigan: W. H. Sherzer, Ypsilanti, Mich., and A. W. Grabau, New York City. (By permission of the state geologist of Michigan.)

In the vicinity of Detroit some 275 feet of dolomites and limestones overlie the Sylvania sandstone, and constitute the Upper Monroe. This series has been traced through parts of Wayne and Monroe counties and into the adjoining regions of Ohio and Canada. A threefold division is possible in the Detroit region, but in most of the other localities one or more of the members disappear by overlap on the Sylvania as a basal bed or by pre-Onondaga erosion. A pronounced hiatus exists between these Upper Siluric beds and the Mid-Devonic Dundee limestone, which rests disconformably on various members of the Upper Monroe, or even on the Sylvania. Two distinct faunæ are recognizable in the Upper Monroe. In the lower two members the fauna is coralline, the middle member (Anderdon limestone) being in most localities a more or less continuous coral and stromatopora reef. A considerable number of species has been obtained from this limestone. The corals are nearly all closely allied to Mid-Devonic types. The stromatoporoids are chiefly Siluric, though two Devonic genera with one species each occur. The brachiopods are Siluric, but the pelecypods are of Devonic genera and species not heretofore known from the Siluric of America. The gastropods and cephalopods, on the other hand, are all of Siluric types. This remarkable fauna of the Anderdon bed is soon displaced in the overlying dolomites by a more strictly Siluric fauna, though even here species of Devonic affinities are not unknown. The fauna of Gothland is similar in many respects to the highest Siluric fauna, the species, while not identical, being closely representative. The bearings of these facts on the paleographic conditions of North America in late Siluric time will be discussed.

The Nomenclature and Subdivisions of the Upper Siluric Strata of Michigan, Ohio and Western New York: A. C. LANE, CHARLES S. PROSSER, W. H. SHERZER and A. W. GRABAU.

The Monroe formation of Michigan and Ohio comprises a number of paleontologic zones, each ranging through from fifty to two hundred feet of strata. The species of each zone are restricted to it, and the zones are recognizable at widely distant localities. The lowest of these extends into western New York, having been named by Grabau, in 1898, the "Greenfield formation," and being represented in eastern New York by the Cobleskill Limestone. The characteristics of the several divisions were discussed, and the conclusions reached by the four authors given. Names for the divisions were proposed and their distribution given.

The papers were discussed by A. C. Lawson, A. P. Coleman, A. M. Miller, H. M. Ami, I. C. White and A. C. Lane.

The concluding paper of the afternoon was

Structure and Stratigraphy of the Ouachita Ordovician Area, Arkansas: A. H. PURDUE, Fayetteville, Ark.

Discussed by A. C. Lane and G. K. Gilbert.

Soon after 5 o'clock the society adjourned and at 7:30 met again in the dining room of the Hotel Alvarado for its annual dinner, which was enjoyed by thirty-seven persons, including a few of the prominent educators of the territory.

SESSION OF TUESDAY, DECEMBER 31, 1907

The society convened at 9:10 A.M., with President Van Hise in the chair. The report of a committee favoring the establishment of a series of stations for the study of volcanic and seismic phenomena was adopted. The consideration of an overture on the formation of a Committee on Geological Nomenclature was deferred to the end of the session. The report of the council was accepted and ordered printed in the *Proceedings*, and the auditing committee was continued and given leave to report to council. The society then proceeded with the reading of papers, the first two being presented together by Professor J. E. Wolff. They were

Notes on the Crazy Mountains, Montana: JOHN E. WOLFF, Cambridge, Mass.

The Crazy Mountains were visited by the author in 1883 and 1889, and a paper on their geology was published in the *Proceedings* in 1892. Last summer, with Dr. G. R. Mansfield and Mr. H. E. Merwin, a review was made of their physiographic and geologic features, and some three hundred photographs were obtained, dealing with points of especial interest. One small glacier was discovered and visited, and another, not so readily accessible, was noted; the relative age of the granite-diorite stocks and of alkali-syenite was found and minor points determined. After a review of the geology of the mountains and of their special features, the results of last summer's work were described and the whole illustrated by a small selection of lantern slides. The accompanying paper, by Dr. Mansfield, was included in Professor Wolff's presentation.

Glaciation in the Crazy Mountains of Montana: GEORGE ROGERS MANSFIELD, Cambridge, Mass. (Introduced by J. E. Wolff.)

During the Glacial Period the Crazy Mountains were the seat of local glaciation. All the higher valleys contained small glaciers, as indicated by the numerous cirques. Some of the glaciers on the south and east slopes attained considerable size, notably those of Big Timber and Sweetgrass-American Fork canyons, which must have had

lengths of approximately 15 to 18 miles, as shown by the extent of morainic deposits. Glaciation is not yet extinct. A tiny glacier was seen at the head of Big Timber and another in Sweetgrass Canyon, and a third is reported by Assistant Forester Wilson at the head of Rock Creek. Glacial topography predominates throughout the southern section of the mountains and occurs locally in the southern section. Striæ and truncated valley spurs along the sides of the canyons show that the ice must have been 500 to 800 feet thick. The glaciation succeeded a long erosion period in which the region had reached an early stage of peneplanation. It continued long enough to form broad, deep troughs in the weaker rocks and to produce much of the sharp arête topography so characteristic of the southern section of the mountains. Later stream erosion has incised the glacial deposits and in some cases the old troughs.

The papers were discussed by A. C. Lawson.

The following papers were read by title:

The Shaler Mountains, Unalaska, a Granite Core to the Aleutian Islands: T. A. Jaggar, Jr., Boston, Mass.

The Growth and Destruction of Metcalf Cone, Bogosloff Island, 1906–7: T. A. Jaggar, Jr., Boston, Mass.

Then was read

The Sandia Mountains: W. G. Tight, Albuquerque, N. M.

The following papers were then read by title:

The Geology of the Alaska Range: A. H. Brooks, Washington, D. C.

The Paleozoic and Associated Rocks of the Upper Yukon Basin: A. H. Brooks and E. M. Kindle.

Discovery of Fish Remains in the Ordovician of the Black Hills: N. H. Darton, Washington, D. C.

The next paper read was

The Topaz-bearing Rhyolite of the Thomas Mountains, Utah: Horace B. Patton, Golden, Colo.

Extensive rhyolite flows occur in the Thomas Mountains of Juab County, Utah, associated with somewhat more basic eruptives. The rhyolite has been profoundly affected by mineralizing vapors that have removed all trace of dark-colored constituents and have caused the development of a surprising number of topaz crystals, with occasional garnet and specular hematite. The topaz crystals occur, first, in lithophysal cavities associated with quartz, and are then mostly clear crystals having a handsome brownish-yellow wine-color that quickly disappears on exposure to direct sunlight; second, imbedded in the solid rhyolite and having frayed out ends but fairly well developed prismatic faces. These are brownish in color before exposure to light, but are rendered opaque by numerous enclosures of quartz crystals. Similar crystals, but perfectly developed and with double terminations, were found imbedded in fragments of a very fine grained rhyolite tuff, the fragments being themselves inclosed in rhyolite. Discussed by G. K. Gilbert.

The next two papers were read without break.

Strata containing the Jurassic Flora of Oregon: J. S. Diller, Washington, D. C.

The Jurassic flora of Oregon has been described and designated by Professors Lester F. Ward and William M. Fontaine in the U. S. Geological Survey Twentieth Annual Report, pt. 2, p. 217 and Monograph 48. The localities of its occurrence have been greatly extended among the Klamath mountains of California, and several distinct faunas have been found at different places in the same strata. On the one hand it is clearly associated with a

characteristic Knoxville fauna, and on the other with a fauna that may be older than the Mariposa.

Local Silicification of the Knoxville: J. S. DILLER, Washington, D. C.

There are certain localities in the Riddles Quadrangle and the adjacent region of Oregon in which portions of the Knoxville strata are silicified and contain numerous small quartz veins. In these quartz-veined rocks *Ancella pioclii* and *Ancella crassicollis* are widely but sparsely distributed. When these fossils are abundant the cement is calcareous and the rocks are less firmly lithified. Discussed by A. C. Lawson.

On account of the special interest due to the excursion after the meeting to the Grand Canyon of the Colorado, the following paper was, in the absence of its author, read by Dr. C. W. Hayes:

Wind Erosion in the Plateau Country: WHITMAN CROSS, Washington, D. C.

The next paper was read by title:

The Association of Pegmatite with Hornblendic Border Beds of Granite and the Appearance of Large Isolated Masses of the Two together Deep in the Ground: B. K. EMERSON, Amherst, Mass.

The next paper was read by Mr. Louderback. It was

Benitoite, its Mineralogy, Paragenesis and Geological Occurrence: GEORGE D. LOUDERBACK and W. C. BLASDALE, Berkeley, Cal.

Benitoite and the associated minerals were briefly described and chemical analyses presented. The paragenesis and geological mode of occurrence were discussed and compared with geologically related but mineralogically different deposits in the same geologic province. Discussed by W. G. Tight.

The next papers were read by title, as follows:

The Igneous Rocks of the Ortez Mountains: IDA H. OGILVIE, New York, N. Y.

The Preglacial Drainage in Central Western New York: AMADEUS W. GRABAU, New York, N. Y.

Geographic Cycle in an Arid Climate: CHARLES R. KEYES, Des Moines, Ia.

The next paper read was

Shoreline Studies on Lake Ontario and Erie: ALFRED W. G. WILSON, Montreal, Canada.

The initial shore lines of these lakes were very complex because of the complex character of the basins in which they lie. The process by which the shore lines have been brought to their present stage of development is almost wholly due to the action of waves and the currents generated by them. Tides and other currents strong enough to be effective agents in transportation do not exist in the Great Lakes. The materials found on the shores are almost wholly of glacial origin. They are being distributed along the shores by the shore processes, and there is evidence of the existence of two nodal points on each lake, one on the north shore, and one on the south. East of these points the resultant general movement of shore débris is east, west of these points it is west. Locally there may be at any specified time movements in either direction, according tc the direction of wind and wave at that time.

Some special features of the shore lines were described in detail—such as Toronto Island on Lake Ontario, Long Point, Rondeau Point, Point Pelee and Erie Point, on Lake Erie.

The place of the shore lines in the cycle of shore development was considered and they were classed as adolescent.

The following papers were then read by title:

Faults and Folds of the Grand Canyon District: Douglas Wilson Johnson, Cambridge, Mass.

Coon Butte, Arizona: John B. Hastings, Denver, Colo.

The Occurrence of Petroleum in the Coast Counties of California: Ralph Arnold, Washington, D. C.

Stream Conglomerate in the Mt. Diablo Range, Calif.: R. Arnold and R. Anderson.

Distribution of Gold in the Saddle and Leg Region of the Meguma Series of Nova Scotia: J. Edmund Woodman, Halifax, N. S.

Probable Age of Meguma Series, Nova Scotia: J. Edmund Woodman, Halifax, N. S.

The Giant Springs at Great Falls, Montana: C. A. Fisher. (Introduced by C. W. Hayes.)

After the end of the reading of formal papers, Dr. C. W. Hayes informally exhibited a set of photographs of the fossil woods of Arizona together with notes on them by Dr. David White, paleobotanist to the United States Geological Survey. Then President W. G. Tight exhibited and described a series of stereopticon slides illustrating glacial and other phenomena among the high Andes of Bolivia and the scientific program was declared finished.

The question of endeavoring to form a General Committee on Geological Nomenclature was thoroughly discussed by C. R. Van Hise, A. C. Lane, A. C. Lawson, A. P. Coleman, G. K. Gilbert, H. E. Gregory, R. D. George, C. W. Hayes and W. G. Tight, and the following action was taken unanimously:

The Geological Society of America recommends to the various organizations concerned:

1. That a general Committee on Geological Nomenclature be formed; one fifth of its members to be from the United States Geological Survey, one fifth from the Canadian Geological Survey organizations, one fifth from Mexico and one fifth from geologists at large selected by the Geological Society of America.

2. That this general committee have authority to appoint special committees on nomenclature from within or without its own membership for the investigation of the particular questions referred to them, the special committees to report back their conclusions to the general committee with full reasons therefor; the different sections to report in turn to their own organizations.

3. That the fact that any subject is under discussion by this general committee be made known to the scientific public at large.

The purpose of the recommendations is to provide a source from which any geologist may on application obtain advice regarding nomenclature.

The following resolutions of thanks were presented by Mr. G. K. Gilbert, seconded by President Van Hise and heartily adopted.

The Geological Society of America acknowledges with gratitude the many and substantial courtesies extended to it by the citizens and the Commercial Club of the City of Albuquerque.

The society also tenders its sincere and emphatic thanks to the University of New Mexico and particularly to President W. G. Tight for the hospitality it has enjoyed, a hospitality which included arrangements of exceptional completeness and attentions most assiduous.

The following fellows of the society registered as being in attendance at the meeting: Charles R. Van Hise, H. B. Patton, George E. Collie, G. K. Gilbert, George

D. Louderback, Herbert E. Gregory, W. G. Miller, T. L. Walker, Andrew C. Lawson, C. W. Hayes, G. D. Harris, Alfred W. G. Wilson, R. W. Brock, A. H. Purdue, I. C. White, Frank R. Van Horn, Alfred C. Lane, H. M. Ami, J. S. Diller, H. P. Cushing, A. P. Coleman, R. D. George, Samuel Calvin, W. G. Tight, John E. Wolff, Arthur M. Miller, F. W. Cragin and E. O. Hovey. There were in addition at least five visiting geologists, not members of the society, and many students and casual visitors.

The Cordilleran Section met with the general society. On Tuesday, December 31, the section held a business session at which Andrew C. Lawson and George D. Louderback were reelected chairman and secretary respectively.

The following officers were elected by the general society for the year 1908:

President—Samuel Calvin, Iowa City, Iowa.

First Vice-president—George F. Becker, Washington, D. C.

Second Vice-president—A. C. Lawson, Berkeley, California.

Secretary—Edmund Otis Hovey, New York City.

Treasurer—William Bullock Clark, Baltimore, Md.

Editor—Joseph Stanley-Brown, Cold Spring Harbor, N. Y.

Librarian—H. P. Cushing, Cleveland, Ohio.

Councilors—H. P. Cushing, Cleveland, Ohio, and H. B. Patton, Golden, Colorado.

The council voted to accept the invitation which had been received from the authorities of Yale University to meet in New Haven, Conn., next winter. It was decided to hold the meeting during the week of December 29, 1908.

EDMUND OTIS HOVEY,
Secretary

THE AMERICAN BREEDERS' ASSOCIATION

THE fourth annual meeting of the American Breeders' Association was held at Washington, January 28–30, 1908. This association now comprises about 1,100 members and includes the more active breeders of the country, both those engaged in plant breeding and those who are breeding animals. It has attempted to bring together those who are doing breeding work with scientific aims and those whose aims are primarily commercial or "fancy." This attempt has been successful to a marked degree; not only in the meetings of the association, which have been well attended by all classes of breeders, but also in the three year-books which have appeared and which undoubtedly have skimmed the cream of the stupendous yield of results of the breeding industry during the past few years. Take, for example, the last year-book. It contains papers on breeding horses by Professor C. W. Gay, of the Ohio State University; cattelo by C. J. Jones ("Buffalo" Jones), of Nevada; dairy cattle by M. A. Scoville, Director of the Kentucky Agricultural Experiment Station; swine by Professor D. A. Gaumnitz of the Minnesota Station, and Geo. M. Rommel, of the U. S. Department of Agriculture; poultry by Professor J. E. Rice, of Cornell University; sugar beets by J. E. W. Tracy, of the U. S. Department of Agriculture; corn by Eugene and J. D. Funk, of Funk Brothers, Illinois, leading commercial breeders; carnations by J. B. Norton; nut and forest trees by Messrs. Sudworth and A. D. Hopkins, of Washington. There are theoretical papers by Castle, Shull, Q. I. Simpson, C. W. Ward, Spillman and others, the commercial men uniting with the theoretical men in these papers also.

The Washington meeting was not behind its predecessors in interest. Reports of committees occupied, perhaps, a larger part of the program than hitherto. Among these reports may be mentioned that of Mr. David G. Fairchild on the "Introduction of Animals and Plants." He called attention to the danger of introducing

noxious plants and animals with the useful and urged that investigations should be made as to the best method of shipping plants and animals so as to prevent introducing diseases or injurious insects. Methods of quarantine should be made the object of a rigorous scientific inquiry. The discussion brought out the present danger from the importation to this country of a *Peronospora* disease of corn that has recently appeared in Java; and a new disease that appeared among cattle in India two years ago and has cost much to eradicate.

A report on "Animal Hybridizing" was read by Professor W. J. Spillman. The greater part of the report was based on the work of Mr. M. M. Boyd, of Bobcaygeon, Ontario, who is crossing bison and cattle. The hybrids are large; the hump of the bison is dominant (though incompletely so) and, in consequence, the cuts of this part of the vertebral column contain, in the hybrid, double the quantity of lean meat that is yielded by cattle. The lean hind quarters of the bison are recessive, consequently the hybrid offers large cuts of meat in this valuable portion also. Certain difficulties occur in hybridizing. The bison is usually taken as bull, but the abnormal amount of amniotic fluid produced frequently kills the cow, so the cow must be as large as possible. More male hybrids die early than females and they are often sterile, but several good breeders were obtained that were fertile with either parent species. Mr. Spillman referred also to the practical application among breeders of the knowledge that the polled condition is a mendelian dominant. An investigation is being made by the committee on the relative vigor of hybrid hogs over pure bred. A case was cited of the recent discovery by a Michigan wool buyer of two samples in his stock that were worth 90 cents per pound as compared with 25 cents for other wool. An attempt will be made to find the origin of this peculiarly valuable wool.

Mr. C. M. Winslow, of the Ayrshire Breeders' Association, spoke of methods used by the association for perfecting the breed. He traced the history of the breed from the native wild cattle of Ayr in Scotland through the first stages of their improvement in 1700 until they were first imported to America in 1837. He stated that the ideal is the creation of a dairy producer rather than a show ring cow and that tests of the milk production of a cow for advanced registry extend over a full year.

A paper by Mr. J. J. Hemingway, of the American Jersey Cattle Club, was read by Dr. W. H. Dexter, of Washington. The history of Jersey cattle in America was traced from their introduction into the United States in 1850. He stated that the ideals of the club were beauty of form inside the type and much milk rich in butterfat; and cited many cases of extremely high performances of individual cows.

Professor Andrew Boss, of the Minnesota Agricultural College, reported on "Breeding for Meat Production." Improvement is brought about by considering performance first and ancestry second. Progress is hampered by the necessity of judging "on the block"—the prize winning individual can not be a breeder. Improvement is made by breeding from individuals that gain weight economically, that are prolific breeders, and that belong to strains or families that show well when cup up for market. Feeding records, breeding records and block records are the basis of improvement. It is also desirable to attempt by breeding to gain disease-resistant strains. In the discussion Mr. Spillman spoke of the high percentage of tuberculosis of calves fed on skim milk or following cows.

If placed early on grass or fed grain they were relatively clear of disease.

Mr. W. M. Hays, assistant secretary of agriculture, reported on cooperative work in animal breeding. He divided the subject into the three classes of creative breeding on the production of new races; pure bred breeding, or the improvement of established races; and herd or grade breeding, or the improvement of ordinary farm stock. He spoke of the work of the committee in the collecting of data concerning individual performance and breeding power and proposed the establishment of circuit breeding as a means of finding individuals with which to establish new and valuable strains.

Professor H. J. Webber reported for the Committee on Theoretical Research in Heredity. He referred to certain deviations from mendelism in apparently mendelian phenomena. Thus in cotton the upland race has smooth black seeds and this smoothness is recessive to the fuzzy type. But the F_1 generation shows all gradations of fuzziness, and it is hard to fix any one of these types. Thus if one selects to breed for the second generation seeds of the black smooth type fuzziness appears in that generation. Dr. Webber also referred to the practise of corn breeders in preventing self-fertilization as based on insufficient evidence; and suggested that we need additional evidence that close inbreeding of corn results in loss of vigor.

Professor Spillman read a paper entitled "Mendelian Phenomena and Discontinuous Variation Color Factors in the Mammalia." He referred to the mendelian nature of poll in cattle. He argued that the fact of the absence of an intermediate type to-day is no proof of the absence of an intermediate form in the ancestry of the existing races. Discontinuity of variation is due to the complexity of the characters of a race. Variations that appear to be discontinuous are due to new combinations of characters. He spoke of belting and other sorts of color inheritance in swine and other mammals.

C. B. Davenport in continuation of the report on heredity gave evidence from poultry breeding that between discontinuous and continuous variation there are all degrees; and that mendelian inheritance differs not in kind but only in degree from the blending inheritance of biometricians.

Mr. C. W. Ward spoke of heredity in carnations. He finds that the amount of any character in the offspring depends upon the proportion of ancestor in which that character occurs. Thus two white flowers may throw all white, but if there has been much pink in the ancestry they may throw some pink in the flowers. Again, the offspring of the same parents will differ with the environmental conditions of the season.

Mr. E. M. East, of New Haven, spoke of "Correlated Variations," from the standpoint of plants. Professor W. E. Castle gave an address on "Color Variations of Domesticated Animals." He stated that the colors found are selfs (either black, red, white or gray) or spotted. These various color varieties are known to us best under domestication but they occur also in nature not less than under domestication only in nature they are eliminated; the gray being the usual wild color because less conspicuous. This gray is a complex of three factors: black + yellow + a pigment pattern (banding). Where the pattern factor is absent yellow is dominated and the coat is black. The spotted condition is a mosaic that has arisen secondarily and become fixed in the germ cells.

Mr. A. F. Woods, of the U. S. Department of Agriculture, reported on "Cooperative work in Plant Breeding." First, the committee cooperates with individual farmers by distributing certain seeds.

Some seeds distributed have already developed new varieties as good as, or better than, the strains from which they came. Second, the committee cooperates in synthetic breeding—where a certain foreign variety or species is needed to secure a certain desired combination a man will be sent abroad to get the required species.

Mr. Jouett Shouse, of Lexington, Ky., read a paper on "Improvement of the American Thoroughbred Horse." He traced the history of the thoroughbred in America from "Bull Rock" imported to Virginia from England in 1730. The development of the thoroughbred was bound up with that of racing which was extensively practised from the revolution until the civil war; racing stimulated the breeding of race horses. Since the war racing in the South has languished except at the larger cities, but in the North it has developed, and to-day the thoroughbred is the best it has ever been. Breeding thoroughbreds is an industry worth many millions of dollars and supporting many thousands of people; the industry is centered in Kentucky owing to its favorable climate and soil. The thoroughbred is the foundation of the saddle horse and the standard bred, but the former has more of the thoroughbred than the latter. The great value of the thoroughbred is for crossing with farm mares; the product is the best kind of generally useful horse. The speaker opposed anything which would interfere with horse-racing as bound to discourage breeding the thoroughbred and was led to the conclusion that the elimination of gambling from racing would, by diminishing the interest in racing, have this effect.

Mr. Robert N. Sewall, of Oyster Bay, N. Y., gave an illustrated address on the "Origin of the Modern Horse and his Relationship to the Arabian." He spoke of the dual origin of the horse from the cold-blooded northern horse (Przewalski's horse) and the hot-blooded Lybian horse from which the Arabian has been immediately derived. He showed how the northern horse had been improved by crossing with the Arabian to get our best races and entered a plea for the further development of the Arabian in order further to improve our thoroughbred and standard-bred types.

Mr. C. J. Jones spoke about his work of breeding and hybridizing the American bison, and the successful attempt to make a hardier hybrid. He referred to the necessity of using large cows as mothers on account of the great amount of amniotic fluid surrounding the embryo. He also spoke of his hybrids with Persian sheep which attain a weight of nearly 300 pounds and whose mutton is of superior quality.

Dr. Alexander Graham Bell spoke for the Committee of Eugenics. His paper has been published in *The National Geographic Magazine*.

Many other papers, mostly based on the breeding of plants, were presented on Wednesday and Thursday, including reports of the committees on breeding forest and nut trees by Dr. Pinchot; tobacco, by A. D. Shamel; bush and small fruit, by Professor Hansen; corn, by Mr. J. D. Funk and Dr. Shull. On Thursday afternoon the association was received by President Roosevelt.

The following officers were elected for the year:

President—Hon. James Wilson, Washington, D. C.

Vice-president—C. W. Ward, Queens, N. Y.

Secretary—W. M. Hays, Washington, D. C.

Treasurer—N. H. Gentry, Sedalia, Mo.

Chairman Animal Section—A. P. Grout, Winchester, Ill.

Secretary Animal Section—C. B. Davenport, Cold Spring Harbor, N. Y.

Chairman Plant Section—H. J. Webber, Ithaca, N. Y.

Secretary Plant Section—N. E. Hansen, Brookings, S. Dak.

All persons interested in the science or art of breeding are invited to join the Association and to send their names to the secretary. The membership fee of two dollars includes the year-book of proceedings which can be obtained only by members.

CHAS. B. DAVENPORT

INLAND WATERWAYS[1]

To the Senate and House of Representatives:

I transmit herewith a preliminary report from the Inland Waterways Commission, which was appointed by me last March in response to a wide-spread interest and demand from the people. The basis of this demand lay in the general and admitted inability of the railroads to handle promptly the traffic of the country, and especially the crops of the previous fall.

This report is well worth your attention. It is thorough, conservative, sane and just. It represents the mature judgment of a body of men exceptionally qualified, by personal experience and knowledge of conditions throughout the United States, to understand and discuss the great problem of how best to use our waterways in the interest of all the people. Unusual care has been taken to secure accuracy and balance of statement. If the report errs at all it is by over-conservatism. It contains findings or statements of fact, a number of specific recommendations and an account of inquiries still in progress, and it is based in part on statistics and other information contained in a voluminous appendix. The subject with which it deals is of critical importance both to the present and to the future of our country.

[1] Message from the President, delivered to the Senate and House of Representatives on February 26, 1908.

Our river systems are better adapted to the needs of the people than those of any other country. In extent, distribution, navigability and ease of use, they stand first. Yet the rivers of no other civilized country are so poorly developed, so little used, or play so small a part in the industrial life of the nation as those of the United States. In view of the use made of rivers elsewhere, the failure to use our own is astonishing, and no thoughtful man can believe that it will last. The accompanying report indicates clearly the reasons for it and the way to end it.

The commission finds that it was unregulated railroad competition which prevented or destroyed the development of commerce on our inland waterways. The Mississippi, our greatest natural highway, is a case in point. At one time the traffic upon it was without a rival in any country. The report shows that commerce was driven from the Mississippi by the railroads. While production was limited, the railways, with their convenient terminals, gave quicker and more satisfactory service than the waterways. Later they prevented the restoration of river traffic by keeping down their rates along the rivers, recouping themselves by higher charges elsewhere. They also acquired water fronts and terminals to an extent which made water competition impossible. Throughout the country the railways have secured such control of canals and steamboat lines that to-day inland waterway transportation is largely in their hands. This was natural and doubtless inevitable under the circumstances, but it should not be allowed to continue unless under careful government regulation.

Comparatively little inland freight is carried by boat which is not carried a part of its journey by rail also. As the report shows, the successful development and use of our interstate waterways will require in-

telligent regulation of the relations between rail and water traffic. When this is done the railways and waterways will assist instead of injuring each other. Both will benefit, but the chief benefit will accrue to the people in general through quicker and cheaper transportation.

The report rests throughout on the fundamental conception that every waterway should be made to serve the people as largely and in as many different ways as possible. It is poor business to develop a river for navigation in such a way as to prevent its use for power, when by a little foresight it could be made to serve both purposes. We can not afford needlessly to sacrifice power to irrigation, or irrigation to domestic water-supply, when by taking thought we may have all three. Every stream should be used to the utmost. No stream can be so used unless such use is planned for in advance. When such plans are made we shall find that, instead of interfering, one use can often be made to assist another. Each river system, from its headwaters in the forest to its mouth on the coast, is a single unit and should be treated as such. Navigation of the lower reaches of a stream can not be fully developed without the control of floods and low waters by storage and drainage. Navigable channels are directly concerned with the protection of source waters, and with soil erosion which takes the materials for bars and shoals from the richest portions of our farms. The uses of a stream for domestic and municipal water-supply, for power and in many cases for irrigation, must also be taken into full account.

The development of our inland waterways will have results far beyond the immediate gain to commerce. Deep channels along the Atlantic and Gulf coasts and from the Gulf to the Great Lakes will have high value for the national defense. The use of water power will measurably relieve the drain upon our diminishing supplies of coal, and transportation by water instead of rail only will tend to conserve our iron. Forest protection, without which river improvement can not be permanent, will at the same time help to postpone the threatened timber famine, and will secure us against a total dearth of timber by providing for the perpetuation of the remaining woodlands. Irrigation will create the means of livelihood for millions of people, and supplies of pure water will powerfully promote the public health. If the policy of waterway improvement here recommended is carried out, it will affect for good every citizen of the republic. The national government must play the leading part in securing the largest possible use of our waterways; other agencies can assist, and should assist, but the work is essentially national in its scope.

The various uses of waterways are now dealt with by Bureaus scattered through four federal departments. At present, therefore, it is not possible to deal with a river system as a single problem. But the commission here recommends a policy under which all the commercial and industrial uses of the waterways may be developed at the same time. To that end, congress should provide some administrative machinery for coordinating the work of the various departments so far as it relates to waterways. Otherwise there will not only be delay, but the people as a whole will fail to get from our streams the benefits to which they are justly entitled.

The commission recognizes that the cost of improving our inland waterways will be large, but far less than would be required to relieve the congestion of traffic by railway extension. The benefits of such improvement will be large also, and they will touch the daily life of our people at every point, uniting the interests of all

the states and sections of our country. The cost and the benefits should be equitably distributed, by cooperation with the states and the communities, corporations, and individuals beneficially affected. I heartily concur in the commission's recommendation to this end. Such cooperation should result in united effort in carrying out the great duty of improving our inland waterways. While we delay, our rivers remain unused, our traffic is periodically congested and the material wealth and natural resources of the country related to waterways are being steadily absorbed by great monopolies.

Among these monopolies, as the report of the commission points out, there is no other which threatens, or has ever threatened, such intolerable interference with the daily life of the people as the consolidation of companies controlling water power. I call your special attention to the attempt of the power corporations, through bills introduced at the present session, to escape from the possibility of government regulation in the interest of the people. These bills are intended to enable the corporations to take possession in perpetuity of national forest lands for the purposes of their business, where and as they please, wholly without compensation to the public. Yet the effect of granting such privileges, taken together with rights already acquired under state laws, would be to give away properties of enormous value. Through lack of foresight we have formed the habit of granting without compensation extremely valuable rights amounting to monopolies on navigable streams and on the public domain. The repurchase at great expense of water rights thus carelessly given away without return has already begun in the east, and before long will be necessary in the west also. No rights involving water power should be granted to any corporations in perpetuity, but only for a length of time sufficient to allow them to conduct their business profitably. A reasonable charge should of course be made for valuable rights and privileges which they obtain from the national government. The values for which this charge is made will ultimately, through the natural growth and orderly development of our population and industries, reach enormous amounts. A fair share of the increase should be safeguarded for the benefit of the people, from whose labor it springs. The proceeds thus secured, after the cost of administration and improvement has been met, should naturally be devoted to the development of our inland waterways.

The report justly calls attention to the fact that hitherto our national policy has been one of almost unrestricted disposition and waste of natural resources, and emphasizes the fundamental necessity for conserving these resources upon which our present and future success as a nation primarily rests. Running water is a most valuable natural asset of the people, and there is urgent need for conserving it for navigation, for power, for irrigation and for domestic and municipal supply.

The commission was appointed to obtain information concerning our waterways as related to the general welfare. Much work was done, but more remains to be done before a plan for their development can be prepared in detail. We need additional information on the flow of our streams, the condition of channels, the amount and cost of water traffic, the requirements for terminals, the area in each watershed which should be kept under forest, and the means of preventing soil-waste and the consequent damage to our rivers. But it is neither necessary nor desirable to postpone the beginning of the work until all the facts are obtained. We have suffered heavily in the past from the

lack of adequate transportation facilities, and unless a beginning is made promptly we shall suffer still more heavily in the future.

Being without funds or an expert staff, the commission has confined itself to principles affecting the whole problem and the entire country. Its report is a plea, in the light of actual facts, for simplicity and directness in dealing with the great problem of our inland waterways in the interest of the people. It submits no specific plans or recommendations concerning even the most important projects. The first of these, of course, concerns the Mississippi and its tributaries, whose commercial development will directly affect half our people. The Mississippi should be made a loop of the sea and work upon it should be begun at the earliest possible moment. Only less important is the Atlantic inner passages, parts of which are already under way. The inner passages along the Gulf coast should be extended and connected with the Atlantic waters. The need for the developing of the Pacific coast rivers is not less pressing. Our people are united in support of the immediate adoption of a progressive policy of inland waterway development.

Hitherto our national policy of inland waterway development has been largely negative. No single agency has been responsible under the congress for making the best use of our rivers, or for exercising foresight in their development. In the absence of a comprehensive plan, the only safe policy was one of repression and procrastination. Frequent changes of plan and piecemeal execution of projects have still further hampered improvement. A channel is no deeper than its shallowest reach, and to improve a river short of the point of effective navigability is a sheer waste of all it costs. In spite of large appropriations for their improvement, our rivers are less serviceable for interstate commerce to-day than they were half a century ago, and in spite of the vast increase in our population and commerce they are on the whole less used.

The first condition of successful development of our waterways is a definite and progressive policy. The second is a concrete general plan, prepared by the best experts available, covering every use to which our streams can be put. We shall not succeed until the responsibility for administering the policy and executing and extending the plan is definitely laid on one man or group of men who can be held accountable. Every portion of the general plan should consider and so far as practicable secure to the people the use of water for power, irrigation and domestic supply as well as for navigation. No project should be begun until the funds necessary to complete it promptly are provided, and no plan once under way should be changed except for grave reasons. Work once begun should be prosecuted steadily and vigorously to completion. We must make sure that projects are not undertaken except for sound business reasons, and that the best modern business methods are applied in executing them. The decision to undertake any project should rest on actual need ascertained by investigation and judgment of experts and on its relation to great river systems or to the general plan, and never on mere clamor.

The improvement of our inland waterways can and should be made to pay for itself so far as practicable from the incidental proceeds from water power and other uses. Navigation should, of course, be free. But the greatest return will come from the increased commerce, growth and prosperity of our people. For this we have already waited too long. Adequate funds should be provided, by bond issue

if necessary, and the work should be delayed no longer. The development of our waterways and the conservation of our forests are the two most pressing physical needs of the country. They are interdependent, and they should be met vigorously, together and at once. The questions of organization, powers and appropriations are now before the congress. There is urgent need for prompt and decisive action.

THEODORE ROOSEVELT

SCIENTIFIC BOOKS

Darwinism To-day. A discussion of present-day scientific criticism of the Darwinian selection theories, together with a brief account of the principal other proposed auxiliary and alternative theories of Species-Forming. By VERNON L. KELLOGG. New York, Henry Holt and Co. 1907. Pp. 403.

Undoubtedly the best book of its kind, and cordially to be recommended to the student or layman who struggles with the fluctuations of evolutional belief. This commendation, however, will not seem extreme when it is pointed out that this is practically the only book of its class! For few indeed are the authors who have attempted the herculean task of sifting out the vast literature which has accumulated around the problems of evolution during the past two decades. The present book then is one which fills a decided need. It is brief, clear and contains summaries of general and technical interest which are elsewhere not to be obtained in the English language. Indeed nowhere else will one find attractive digests even of the classical work of Roux, Naegeli and Weismann. The nearest approach to it is Plate's "Über die Bedeutung des Darwin'schen Selectionsprincips," of which a translation has never been published. And to this work Professor Kellogg acknowledges frankly his great indebtedness.

Particularly to be commended in the present book is its style. It breathes of the open air, and leads one, oftener than usual in these days, away from the click of the microtome. The main text of the book is interesting, its illustrations—there are no pictures, by the way—are chosen discreetly, and technical summaries and discussions are usually tucked away in the form of appendices.

The author has brought together the objections to old-fashioned natural selection (which have become a lengthy part of post-Darwinian writings) with a fair degree of completeness. Such objections, off-hand, are these: that natural selection makes for constancy not variability; that it produces changes quantitative not qualitative; that it can operate only on great averages, not on individuals; that it does not account for continued degeneration; that small variations give no "handle" for selection; that sexual selection is impotent; that it explains the survival not the arrival of new variations; that the struggle for survival of one set of characters leaves the others to fall effetely to panmixia; that great variations are apt to be eliminated by panmixia; that plural variations are necessary to insure the origin of species; that correlated variations are excessively difficult to explain; that there is weakness in the evidence as to the elimination of the unfit. And these objections are threshed out in adequate detail.

On the other hand, the author considers, but rather incompletely, the replies of the neo-Darwinians to their critics. He examines, for example, the question of the rise of qualitative differences by correlation; the importance of the principle of change of function, and the demonstrable value of small fluctuating variations in certain cases.

In a book of this kind the critical reader is always interested in determining the point of view of the author himself, and in this regard Professor Kellogg is entitled to hold views by virtue of his own valuable studies on matters evolutional. Professor Kellogg, it appears, feels keenly the criticism directed against the Darwinian factor and pronounces early in his work that "each naturalist for himself must decide how vigorous is selection." Withal, however, he realizes the particular lack of and weakness in substitutional explanations. His

own view of the origin of species is, we gather, a peculiarly composite one; in many regards it resembles Plate's, and is a compound of Darwinism, orthogenesis, mutation (mildly emphasized), Lamarckian use-inheritance, and the "unknown factors." It is clear that he attaches less importance than Plate to the Darwinian factor. Thus he believes that Plate's "passive adaptations" may be explained by other means than by natural selection, and in this regard he derives help from the views of Roux to explain mechanically the initiation of delicate inner adaptations. So, also, it appears, he looks upon organic selection as not strictly neo-Darwinian, for, he argues, if ontogeny can constantly bring into the organism a beneficial structure (as in orthogenesis), what need is there for the selection of minute beneficial variations? On the other hand, he does not sympathize in any sense of the word with teleologicians: and in this regard he stands sharply cut off from several recent writers, for we can not deny that these reactionaries are gathering strength. In explaining "purposive" adaptations he sides rather with Plate, but attributes little value to amphimixis, and he has little leaning to germinal selection. To the various micromeric theories, as well, his attitude is non-sympathetic. To the influence of isolation he gives considerable space and takes a middle ground in estimating its importance. With many critics of selection he agrees that too much prominence in the problem of the origin of species has been given to artificial selection. At the same time he is a convert to the causo-mechanical conception of orthogenesis, which he calls "one of the most important matters connected with the whole great problem of descent," one which deals with the "basic problem," for it touches "the problem of beginnings." He does not indicate, however, to what degree this form of evolution can be regulated, and in this regard is unlike Weismann, who seeks to construct a mechanism, which corrects automatically too extreme a type of orthogenesis.

Kellogg's own conception of evolutionary processes, then, is extremely complicated: and we have not yet included in it the "unknown factors." This article in his faith he declares more emphatically, I think, as he progresses in the book. But it is clear that he does not consider these unknown factors as in any sense vitalistic: he thinks unnecessary a "mysterious tendency of the germ plasm to vary," and, nearing an ultimate problem, suggests that the "inevitable non-identity of vital process and environmental conditions may alone be enough to supply the automatic modifying principle, antedating and preceding selection, which must affect change determinate, though not purposeful. Naegeli's automatic perfecting principle is an impossibility to the thorough-going evolutionist seeking for a causo-mechanical explanation of change, but an automatic modifying principle which results in determinative or purposive change . . . is not that the very thing provided by the simple physical or mechanical impossibility of perfect identity between process and environment in the case of one individual and process in environment in the case of any other?" But this conception of Kellogg is, so far as we can see, little more than the restatement of the idea of environment and variability which has been woven into the warp of discussion ever since evolution has been seriously considered.

In a work of this kind, one should be grateful for its utility and its general accuracy, and not go far out of the way to dig into its structural details. Without wishing to be unduly critical, one might nevertheless point out that in this *Darwinism to-day* there is no reference to many and notable discussions of the last half dozen years, some of which, by the way, were published in the pages of this journal. Nor is the neo-vitalistic side of evolutional philosophy given due consideration—not, be it understood, that the reviewer is in keen sympathy with this point of view. Nor is the more wholesome neo-Lamarckian philosophy expounded adequately. In such a work, there should have been some reference to Pauly's "Darwinismus and Lamarckismus" (1905), and some citation to the Lamarckian utterances of so distinguished a biologist as Professor Boveri (in his address (1906) as

Rector of the University of Würzburg). One does not leave out of sight in commenting on these omissions the fact that the present book aims to be popular, not encyclopedic. Furthermore: There is scanty reference to recent Mendelian work. And there is altogether too brief notice of the evolutional work of paleontologists: the extraordinary studies of Hyatt are inadequately referred to and there is no mention at all of his pupils, Jackson and Grabau. And while Jaekel's epistasis is summarized, there is no reference to the kindred and earlier neotænia of Boas. In the treatment of the environmental factor there is similar unevenness: for while there is given an excellent and detailed account of Wagner's speculations, there is scanty mention of the distinguished services of Professor J. A. Allen, and his name, by the way, does not occur in the index—but this proves nothing, for the index is sadly defective. In general, however, from the point of view of book-making, one does not find serious defects. Printers' slips are not numerous, but one can find them, if he looks hostilely, as he can in any other book. Thus Perameles—even in these days when ill-spelling commends itself to taxonomists—would hardly recognize itself as Permales on page 280. And here and there careless or inaccurate expressions have not been eliminated in the proof. Thus, it is stated that the lung sacs of birds penetrate "through hair fine holes into all the bones," and that in "many fishes the female may never even see the male at spawning time."

BASHFORD DEAN

An Introduction to Vegetable Physiology. By J. REYNOLDS GREEN. Second edition. Pp. xx + 459, 182 figs. in text. Philadelphia, P. Blakiston's Son & Co. $3.00.

The first edition has been favorably known for a number of years and the publication of a second edition aroused the expectations that it might be further improved and brought up to date. However, in the volume before us we find little change from the original imprint. It is indeed to be regarded more as an American reprint than as a second edition in the proper sense of the word. It is noticeable that there is no new preface and that the one printed is word for word the same as the first edition with the exception that the date has been omitted. In fact, throughout the book the plates are almost identical, if not wholly so. The one important difference is that Chapter VIII. of the first edition, entitled "Respiration," has been shifted and amalgamated with Chapter XIX. which deals with the release of energy, the two together constituting Chapter XVIII. of the new edition under the title "Energy of the Plant." This is undoubtedly an improvement and renders the presentation of the nutrition phenomena, already well treated, much more logical and comprehensible. Some smaller changes are to be noted in the alteration of introductory paragraphs to certain chapters and the substitution of the more modern word protein for the older term proteid.

Despite the fact that so little new material has been added, it remains one of the best shorter reading books in physiology that we have in English, particularly in the matter of nutrition physiology, which is treated very much more fully than the growth phenomena. It is perhaps to be regretted that more was not done to amplify the second edition, but if its publication in this country will serve to bring it more to the attention of students here, it will serve a useful purpose.

HERBERT M. RICHARDS

SOCIETIES AND ACADEMIES

THE CHICAGO ACADEMY OF SCIENCES

THE Chicago Academy of Sciences held its annual meeting on Tuesday evening, January 14, 1908, at the academy's building in Lincoln Park. The report of the secretary showed that the work of the academy had been pushed steadily forward during the year and that much had been accomplished in promoting educational matters of a scientific nature among the schools and citizens of Chicago.

Monthly meetings and Friday evening popular lectures have been maintained by the academy, in addition to a number of lectures by other societies, under the auspices of the academy. The most notable of these lectures

by affiliated societies have been twelve lectures given by the Chicago Medical Society and the Society of Social Hygiene on preventive medicine. The Illinois Audubon Society also held its annual meeting in the spring. The total number of lectures and meetings has been thirty-four, at which the combined attendance was 4,008. The smallest number present was fifty and the largest three hundred, the seating capacity of the lecture hall being two hundred.

The academy has been officially represented at several notable gatherings of scientific men, including the Illinois State Academy of Sciences, the Seventh Zoological Congress, the American Association for the Advancement of Science and the American Association of Museums.

The Entomological Section has held eleven meetings, at which papers of interest have been read and discussed.

The Natural History Survey has published two reports on the fauna of the Chicago Area, Bulletin IV., part II., on the "Trilobita of the Niagaran Limestone," by Dr. Stuart Weller, and Bulletin VI., on the "Birds of Chicago," by Mr. F. M. Woodruff. A special illustrated edition of the bird bulletin was prepared for free distribution among the schools and teachers of Chicago and the opportunity was taken advantage of by a large number of both schools and teachers. The academy has been the recipient of many favorable comments for thus aiding in the study of the local bird fauna.

The curator's report showed that interest in the museum by visitors, schools and students was increasing. The schools have made use of the collections to an unprecedented degree and the exhibit collections have been largely used for the acquisition of general information. Laboratory and study facilities have been provided for those who desired to work at the academy building.

During the year the building has been redecorated throughout, the light oak cases on the main floor have been refinished in weathered oak and the interiors of the cases have been painted a blue-gray color. All museum cases have been installed with glass shelves with inconspicuous supports.

The notable additions to the exhibits have been a collection of economic minerals with distribution maps; a collection of Philippine Land Mollusks from the Quadras collection; a large expansion of the exhibit illustrating the pearl button industry; the expansion of the collection of native birds with their nests and eggs or young and with habitat maps, and an ecological collection of invertebrates, arranged in groups.

The label department showed a total of 8,088 labels produced.

A feature of the academy's work has been the identification of material for institutions and individuals, which amounted to 2,625 specimens, submitted by twelve individuals and institutions.

The accessions for the year aggregated 30,111 specimens, of which 28,547 were in the department of Mollusca.

The annual election of officers for the year 1908 resulted as follows:

President—T. C. Chamberlin.

Vice-presidents—Charles S. Raddin and Albert L. Stevenson.

Acting Secretary—Frank C. Baker.

Trustees (five years)—Charles S. Raddin and Charles H. Blatchford.

Executive Board (three years)—Stuart Weller and Lester Curtis.

Frank C. Baker,
Acting Secretary

THE BIOLOGICAL SOCIETY OF WASHINGTON

The 438th meeting was held January 25, 1908, President Stejneger in the chair.

The first communication consisted of an "Exhibition of Colored Lantern Slides by the Autochrome Plates," by Professor W. P. Hay. He discussed the process of direct color photography recently perfected by the Lumières, of Lyons, France, in its relation to scientific work and exhibited a number of lantern slides made on the new "Autochrom" plates.

These plates bear a panchromatic film of great delicacy and sensitiveness underlaid by a stratum of starch grains colored orange-red, purplish blue, and green. The granules aver-

age about 1/2,500 of an inch in diameter, are spread out in a single layer in almost perfect contact with each other and are mixed so intimately and in such proportions that light passing through an unobscured plate appears white, or, more strictly speaking, a neutral gray.

For taking a photograph any ordinary camera may be used but a light orange color screen specially adapted to these plates must be fitted to the lens. The plates must be placed in their holders glass side toward the lens, instead of the reverse as in ordinary plates, so that during the exposure any light which reaches the sensitive film must first encounter the layer of starch grains, each grain of which will allow the passage of light of its own color and prevent the passage of light of any other color. Owing to the color screen and the still more retarding effect of the starch grains the plates are exceedingly slow and the exposures are from 75 to 100 times or more as long as would be required by the most rapid plates under the same conditions of light. After exposure the plate is developed in total darkness in a pyrogallic acid developer for about two and a half minutes, rinsed in water, and at once placed in a bath of permanganate of potash and sulphuric acid and carried from the darkroom into full daylight. The permanganate of potash and sulphuric acid mixture rapidly dissolves away the reduced silver in this negative but does not effect the unreduced portion. A second development in daylight, in paramidophenol, or a similar developer working without alkali, results in the reduction of the hitherto unchanged silver salt of the film and produces a positive in which the form and color of the object photographed are accurately reproduced. The colors, however, are generally weak and the plate must be intensified in order to bring them out in full brilliancy. The operations of clearing, fixing, drying and varnishing follow in rapid succession and the transparency is completed. As yet no method of making a colored print on paper has been perfected, but duplicate transparencies may be made by the ordinary methods.

As a means of easily and quickly producing colored photographs of many kinds of natural history objects this new process presents many advantages and in spite of the cost and shortcomings of the plates will doubtless come extensively into use. The exposure required, even under the most favorable conditions and with the most rapid lens, is so long that photographs of moving objects are out of the question. The plates are much less transparent than ordinary plates and when used as lantern slides require a stereopticon equipped with a powerful light and placed comparatively close to the screen. Added to these disadvantages is the much more serious one, that the colors of the starch granules, on which the color of the image depends, are not stable and gradually disappear if long subjected to the intense concentrated light of the oxyhydrogen or electric lantern.

The lantern slides exhibited covered a wide range of subjects, such as microphotographs of rock sections, various mineral and organic crystals with polarized light, direct photographs of the solar spectrum, copies of paintings, views of beetles, butterflies, shells, flowers, etc., and landscapes, demonstrating conclusively that it is now possible to photograph the color as well as the form of any object and fix them for future reference on a plate which, except under the most trying conditions of light, should last indefinitely.

The next communication, from Dr. F. V. Coville, was on "The Probable Assimilation of Free Nitrogen by the Swamp Blueberry (*Vaccinium corymbosum*)." An abstract on this subject will appear later.

The last communication, entitled "Some Problems and Possibilities in Hop Culture" was presented by Dr. W. W. Stockberger in the form of a lecture illustrated by lantern slides showing methods of cultivation, harvesting and curing the crop, and the comparative growth of local and European varieties on American soils.

Attention was directed to the desirability of selecting varieties adapted to the various conditions of soil and climate, to the influence of seasonal distribution of rainfall on growth and quality and to the necessity of a much broader knowledge of the physiological activi-

ties involved in the process of curing. A machine which promises soon to be available for picking the crop was mentioned as a possible solution of the labor question involved in harvesting.

The opportunity for the improvement of quality through selection and breeding was pointed out, the immediate problem therein being the discrimination of varieties which are now almost hopelessly confused. The work of breeding is further hampered by the fact that while more than a hundred varieties of the female form of the hop have been named only *one* variety of male plants is recognized.

M. C. Marsh,
Recording Secretary

THE GEOLOGICAL SOCIETY OF WASHINGTON

At the 198th meeting of the society, held at the Cosmos Club, on Wednesday evening, January 8, 1908, under informal communications, Mr. E. S. Bastin described a pyrrhotitic peridotite from East Union, Maine. This dike rock is unusual because of the presence in it of nearly 30 per cent. of pyrrhotite so related to fresh olivine and plagioclase grains that it is proved to be an original constituent. The analysis shows the rock to belong to subclass 2 of Class V. It is the first described representative of this subclass and has been named Lermondose. The total percentage of nickel, cobalt, and copper sulphides is about 2 per cent. It furnishes, therefore, an example of an ore of purely igneous origin.

Mr. R. H. Chapman exhibited photographs illustrating an ancient method of ore crushing near Gadug, about 300 miles southeast of Bombay, India. The bedrock with a gradual slope toward a stream has a shallow trench along the higher portion, from which water was fed over the surface, in which more than a hundred saucer-like depressions are located. These holes were used as mortars in which the ore was crushed by stone pestles in the hands of native laborers. Similar forms are known in which the mortars were larger and the crushers were boulders, of one half to one ton weight, which were handled with a framework. It is estimated that this quartz mill was in use about 2,000 years ago.

Regular Program

Centenary of the Geological Society of London: Mr. Whitman Cross.

Some Volcanoes of the Western Mediterranean: Henry S. Washington.

In the summer and fall of 1905 the speaker undertook the investigation of some of the less well-known volcanoes of the western basin of the Mediterranean for the Carnegie Institution of Washington. The volcanoes of Catalonia occupy the site of a Pliocene gulf, and are post-Quaternary. The earlier eruptions formed extensive and often deep lava flows, which partially filled the preexistent and still persistent drainage, and these were followed by the formation of numerous, small, cinder cones. The lavas are feldspar-basalts, nephelite-basalts, and limburgites, of quite uniform chemical characters.

The volcanic rocks of Sardinia are referred to three periods: a series of sheets of basalts and rhyolites, of Tertiary age, which cover extensive areas in western Sardinia; the subsequent large volcanoes of Monte Ferru and Monte Arci, near the west coast; and the numerous, small, recent, cinder cones which extend from near Bonorva to near Sassari. The lavas of Monte Ferru are trachytes and phonolites, which form the core of the deeply dissected volcano, and rather monotonous basalts, which cover the other lavas and extend far over the surrounding country. Similarly, the core of Monte Arci is composed of chemically uniform, though texturally diverse, rhyolites, covered by a mantle of later basalts. The recent cinder cones are wholly basaltic. Their eruption antedated the construction of the prehistoric nuraghi, for which Sardinia is famous.

The island of Pantelleria is wholly volcanic, the earliest eruptions being the trachytes of the dominating, but badly worn, Montagna Grande, with flows of other trachytic rocks. These were followed by flank eruptions of pantellerites, very high in silica and low in alumina, and distinctly sodic. The latest eruptions are basaltic and formed small cinder cones, like those of Catalonia and Sardinia,

while submarine eruptions took place in the neighborhood of Pantelleria in 1831 and 1891. The small and hitherto undescribed island of Linosa, about one square mile in area, contains nine volcanic cones. These are referred to two periods; an earlier one of cones of greenish and yellow tuffs, containing blocks of basalt, and a later one of cinder cones, with lava flows of feldspar-basalt and nephelite-basalt. The Linosa lavas are very uniform in chemical characters.

Many analyses of the rocks have been made, and they are shown to be closely alike in their chemical features, one of the most notable of these being the uniformly high percentage of titanium. All the volcanoes mentioned are considered, therefore, to be genetically related and to belong to the same co-magmatic region or petrographic province, which possibly extends into Africa, as far as the Great Rift Valley. This petrographic province is very different in its characters from those of the Italian peninsula and also from that embracing the volcanoes of the Grecian Archipelago and Asia Minor, which have also been studied by the speaker. The reputed volcano of Boukournine, near Tunis, was visited and was found to be composed entirely of limestone. A brief account was given of the occurrence of orbicular diorite at Santa Lucia di Tallano in Corsica. The paper was illustrated by lantern-slides.

RALPH ARNOLD,
Secretary

DISCUSSION AND CORRESPONDENCE

THE DISTRIBUTION OF CLOSELY ALLIED SPECIES

THE idea that closely related species do not possess identical geographical distributions is a theoretical deduction which should be rigorously tested by the examination of actual cases. Recently, R. G. Leavitt has done this with reference to plants (chiefly orchids),[1] and arrives at the conclusion that this principle, as expressed by D. S. Jordan,[2] is not well supported.

Nevertheless, I think that Jordan's sentence is fundamentally correct, provided it is changed so as to refer not only to purely geographical, but also to ecological conditions.

I have expressed this idea in two sentences:[3] (1) "Closely allied species occupy neighboring areas"; (2) "More or less closely allied species occupying the same or nearly the same territory, generally possess different habits." Further, I have treated of this subject more especially in a recent publication,[4] classifying the forms of segregation of closely allied species, geographically as well as ecologically.

It will be remarked that, wherever I have talked about this subject, I always have used the word *species*.[5] Leavitt, in the paper referred to (p. 230), deliberately changes the word *species* in Jordan's sentence into *kind*, and investigates the distribution of "pairs of kinds" of plants. This substitution, *kind* or *form* in place of *species*, is also advocated by J. A. Allen.[6]

This change, however, is entirely inadmissible. I used the above phrases in connection with the bearing of isolation or segregation upon the formation of species (speciation), and wanted to bring out the idea that geographical or ecological segregation is a criterion by which *species* may be recognized. I intended the word "species" in the strict taxonomic sense, that is to say, for "forms" which are morphologically separated from the allied forms. My object was to express the opinion that the morphological segregation of true species is connected with and due to some kind of segregation in the physical conditions under which the "species" live, and I pointed out that this might be either purely geographical or ecological. *Ecological or geographical segregation is the factor which results in speciation,* that is to say, the factor which

[1] "The Geographical Distribution of Nearly Related Species," *American Naturalist*, 41, 1907, pp. 207–240.

[2] "Given any species in any region, the nearest related species is not likely to be found in the same region" (SCIENCE, 22, 1905, p. 547).

[3] *Proceedings American Philosophical Society*, 44, 1905, pp. 127, 128.

[4] *American Naturalist*, 41, 1907, p. 654.

[5] "The Crawfishes of the State of Pennsylvania," *Memoirs Carnegie Museum*, 2, 1906, p. 512.

[6] See also SCIENCE, 23, 1906, p. 949.

makes species out of variations or varieties ("forms" or "kinds").

Consequently, when Leavitt demonstrates that there are many "pairs of kinds" of plants, which possess the same range, he does not prove that the sentence referred to is incorrect, but he may have shown only that the "kinds" he discusses *are not species.*

This is clearly seen in the instance of *Cypripedium pubescens* and *parviflorum* (p. 235). Even granted that the ranges of these two forms practically coincide (p. 236), we may conclude as well that they are not species. This indeed is supported by other observations. O. W. Knight has shown[7] that these two "forms" are merely variations, which may be observed successively in one and the same plant, according to the character of the environment: *C. parviflorum* has been transformed into *C. pubescens* by the change of the environment, and *vice versa.*

In other cases, quoted by Leavitt, we may have to deal with species: but the facts given are too scanty to form an opinion. I have repeatedly emphasized that only an exact and *complete* knowledge of the distribution is apt to give us the means of judging as to segregation and speciation of the forms in question. Leavitt's instances are very defective in this point, and I shall take up one of them, in order to make clear what I mean.

The range of *Spiranthes cernua* (=*Ibidium cernuum*) is given (p. 234 f.) as: Massachusetts, Ontario, Iowa, Georgia;[8] and that of *Spiranthes odorata* as: Georgia, Florida, Alabama, Louisiana, Texas.[9] Thus, as Leavitt says, the range of the latter "coincides widely with that of *S. cernua.*" However, we do not know whether the two "forms" are ever found associated, *i. e.*, under the same environment, in those parts of their range which overlap in the southern states. Besides, it is evident that the one is more northern, the other more southern in its distribution, and possibly their centers of origin and radiation were segregated accordingly. And finally, the morphological facts are different from what they appear in Leavitt's statement.

According to this (and to the quotations from Britton and Brown), we should expect *Ibidium cernuum* in western Pennsylvania. But this species seems to be absent here, and it is represented by another one, described recently by O. E. Jennings:[10] *Ibidium incurvum.* This was first discovered in Erie County, Pa. But additional localities in Beaver, Allegheny, Westmoreland and Armstrong Counties, Pa., are represented in the herbarium of the Carnegie Museum (the specimens were partly labeled *cernuum,* partly *odoratum*), and the new species has been found in large numbers very recently (September and October, 1907) in Allegheny county by Jennings, and in Beaver county by the present writer. *Ibidium cernuum* is absent in this part of Pennsylvania: at any rate, all plants called by this name seem to be *incurvum.* Thus, with reference to *Ibidium cernuum* and *incurvum,* the rule holds good, that two closely allied species are not found associated under the same conditions, and this rule also fits beautifully the case of *Ibidium incurvum* and *odoratum,* which are even more closely allied. It remains to be seen what the distribution of *I. incurvum* will turn out to be outside of western Pennsylvania. Possibly, many plants called *cernuum* or *odoratum* may be the new species.

Of course, the question is not yet settled. I only took up this instance in order to show how incomplete our knowledge is. Large tracts of the country are poorly or not at all known, and in addition, the knowledge of the morphological details is often defective. It would not be astonishing. if finally it should be found that *Ibidium odoratum* runs through *I. incurvum* into *I. cernuum,* but for the present all these forms are morphologically well separated, a separation which corresponds, at

[7] "Some Notes on our Yellow Cypripediums," *Rhodora,* 8, 1906, pp. 93, 94.

[8] According to Britton and Brown, "Illustrated Flora of the United States," 1, 1896, p. 471: Nova Scotia to Ontario and Minnesota, south to Florida and Louisiana.

[9] *Ibid.:* North Carolina to Kentucky, Florida and Louisiana.

[10] *Annals Carnegie Museum,* 3, 1906, p. 483.

least in part, to geographical segregation. If further studies should show that there is segregation, geographical or ecological, between these forms, then they are *species;* if not, they are *varieties,* which fact then also will be expressed in their morphological condition, one form running into the other at least in certain parts of their ranges.

A. E. ORTMANN

CARNEGIE MUSEUM,
PITTSBURG, PA.,
November 23, 1907

SPECIAL ARTICLES

CARBOHYDRATE METABOLISM

WHEN we consider the fact that the products of the oxidation of sugars *in vitro* are not well known, the uncertainty that prevails regarding the mechanism of utilization of the common sugars in the body can be understood. Not only are the products of their metabolism unknown, but the form in which the carbohydrate must reach the cell to be available as a food is also not beyond dispute. It is ordinarily held that the cell can utilize sugar as such. On the other hand, some hold that the sugar must reach the cell in a colloid form or combination to act as a food. Again, it is claimed that dextrose is the form in which sugar is utilized by the tissues, and that the other sugars, as levulose or galactose, are transformed into dextrose before they are oxidized. The present preliminary report aims to give the results of some work on this problem.

The method adopted consists essentially of perfusing an organ with blood containing a known quantity of the sugar under investigation, and determining the loss after perfusion. The weight of the organs before and after perfusion is taken into account; the loss in volume of the perfused liquid; the gain in weight of the organ and the total carbohydrate before and after perfusion. In this way the quantity utilized by the organ may be determined. Perfusion was also done in dead organs to see that the mechanical construction had nothing to do with the loss of sugar. Also samples of the liquid were kept at the temperature of the perfused blood (37–40° C.) during the time of perfusion to ascertain the extent of glycolysis occurring without perfusion.

A very brief summary of results will be given:

Experiment I.—Perfusion of the hind legs of a dog with dextrose-blood solution. The legs were stimulated at 30 times per minute and the perfusion was made at the rate of about 125 c.c. in ten minutes.

	Dextrose per mille.
Blood before perfusion	3.1916
Blood after 20 minutes	2.9659
Blood after 30 minutes	2.7750
Blood after 45 minutes	2.4736
Blood after 65 minutes	1.9473
Blood after 71 minutes	1.5384

It is readily seen that a loss of sugar has taken place. This loss could occur in one of several ways: (1) by actual oxidation; (2) by accumulation in the surrounding tissues; (3) by storage in the tissues as glycogen, etc.; or (4) by absorption by the tissues. As a result of a number of experiments it has been found that both oxidation and accumulation take place. In every instance there was a distinct loss of dextrose when perfused through the living tissue. The accumulation by edema and other means increased as the tissues died, and in the dead organs an accumulation took place without any oxidation.

When the liver was perfused, there was likewise a loss of sugar. No glycogen storage occurred unless the perfusion was commenced very rapidly after the interruption of the circulation. In other words, the glycogen-storing function of the liver was lost much more quickly than the glycolytic function. No definite conclusions could be drawn as to the influence of the hepatic circulation when perfusion was made through the hepatic artery, simultaneously with the perfusion through the portal, the ordinary method used.

The utilization of levulose: What has been said of dextrose will hold good for levulose. A brief summary of results with this sugar will illustrate.

Weight of perfused leg	1,000 gms.
Weight of muscles of same	610 "
Weight of opposite leg	1,020 "

Total carbohydrate in leg before perfusion (glycogen and sugar) (.12 per cent.)	1.260 gms.
Total carbohydrate in leg after perfusion (.1645 per cent.)	1.645 "
Gain	.3850 "
Total volume blood used in perfusion	500 c.c.
Content of sugar at beginning (.5472 per cent.)	2.7160 "
After four perfusions (2 hrs., 30 mins.) blood remained after samples were taken for analysis	310 c.c.
Amount of sugar this contained (.4348 per cent.)	1.3478 "
Total loss of sugar in blood	1.3682 "
Sugar recovered from samples	.3508 "
Recovered by difference in muscles at end	.3850 "
Sugar loss by oxidation	.6324 "

If the amount of dextrose in the original blood be calculated at one part per thousand there would be at least .3204 gm. of levulose used by the muscles, granting that the dextrose be utilized before the levulose, an assumption which has no facts to support it.

A second experiment carried out in the same way where the sugar at the beginning was .8620 per cent. at the end of the perfusion of over four hours' duration contained .3360 per cent. The total loss of sugar was 1.0997 gm. Dextrose content at beginning was .0801 per cent. Loss of levulose at least .7693 gm. The results show that levulose as dextrose is attacked directly by the living tissues. If there be a conversion of either into glycogen it takes place in the muscle as it is oxidized, which is highly improbable.

Maltose is not used directly by the muscle. There is some loss of sugar, but if we assume that the dextrose in the blood is utilized in preference to maltose, no reduction of the quantity of maltose takes place. If we grant that both are used equally there could be at most only a slight reduction of the maltose. Some interesting features in connection with the vitality of the muscles are brought out in maltose perfusions, *e. g.*,

	Per Cent.
The blood after addition of maltose	.6325
The blood after 30 minutes (first perfusion)	.5720
The blood after 68 minutes (fifth perfusion)	.5720
The blood after 4 hrs., 16 mins. (fourteenth perfusion)	.4720
Sugar in non-perfused leg	.0500
Sugar in perfused leg at end of experiment	.2250

The total sugar recovered is almost equal to that at the beginning. Between the fifth perfusion and the fourteenth the reaction to stimulation decreased markedly, and the transudation of the sugar into the muscles appeared to occur *pari passu* with the loss of the vitality of the muscle. The loss of sugar in the first thirty minutes was less than the dextrose content of the blood at the beginning. The loss thereafter was very slight.

Investigation of the other sugars has not been concluded.

Hugh McGuigan
Washington University
Medical School

QUOTATIONS

THE COMMITTEE OF ONE HUNDRED

One of the largest and most enthusiastic of the sectional meetings of the American Association for the Advancement of Science, recently held in Chicago, was the Symposium on Federal Regulation of Public Health, held by the Economic Section in conjunction with the Committee of One Hundred on National Health, and representatives from other great organizations. The opening address was by Professor William H. Welch, the retiring president of the American Association for the Advancement of Science, and in it he emphasized the importance of the movement conducted by the Committee of One Hundred. He described the existing neglect of health as shameful, and pointed out that, if existing hygienic knowledge were fully applied, the death-rate might be cut in two. As examples of what a Federal Health Bureau might do he cited the work of Pasteur and Koch, whose best work was done for the national governments of France and Germany, though the benefits have been shared by all nations. In America we lack even the statistics of disease except in a limited area. Professor F. F. Wesbrook, the dean of the Medical School of the University of Minnesota, showed the need

of federal jurisdiction over railways and waterways, which carry diseases from one state to another, and showed that such jurisdiction would have prevented the Chicago-St. Louis controversy over the drainage canal. Mr. Edward T. Devine made a stirring speech, bringing home to the audience what a reduction in the death-rate means in the concrete experience of the individual. The elimination of deaths from tuberculosis, even if the same number of deaths were added to the mortality from other diseases coming later in life, would lengthen the average life by twelve years. In the summer of 1906 Professor J. P. Norton, of Yale, read a paper before the Economic Section of the American Association for the Advancement of Science, on the "Economic Advisability of a National Organization of Health," which excited much interest and resulted in the formation of the Committee of One Hundred. This committee was first formally organized on April 18, 1907. Its officers at present are: President, Irving Fisher; secretary, Edward T. Devine; treasurer, Title Guarantee and Trust Company; vice-presidents, the Rev. Lyman Abbott, Miss Jane Addams, Dr. Felix Adler, President James B. Angell, the Hon. Joseph H. Choate, President Charles W. Eliot, Archbishop Ireland, the Hon. Ben B. Lindsey, Mr. John Mitchell, Dr. William H. Welch. In the following month (May, 1907) President Roosevelt sent the committee a letter of indorsement in which he said:

> Our national health is physically our greatest national asset. To prevent any possible deterioration of the American stock should be a national ambition. We can not too strongly insist on the necessity of proper ideals for the family, for simple living, and for those habits and tastes which produce vigor and make men capable of strenuous service for their country. The preservation of national vigor should be a matter of patriotism. I can most cordially commend the endeavors of your committee to bring these matters prominently before the public.

There are now about six thousand five hundred persons on the various mailing lists of the Committee of One Hundred. The American Health League, the national society affiliated with the Committee of One Hundred, is growing with amazing rapidity—a fact significant of the popular interest in the movement. Every member of congress has been written to, and a large number have expressed their willingness to advocate health measures. The first legislative measure will be one to authorize the President to redistribute the existing scientific and health bureaus of the government. The recent unfortunate experience with the present arrangement of bureaus in the navy is only one of many instances of lack of cooperation and coordination. It is not anticipated that these existing bureaus will oppose a rearrangement. On the contrary, it is known that most of them favor it, especially as, after the redistribution, their powers and appropriations, as well as their efficiency, will be increased. The committee has received the indorsement of the American Medical Association and of a number of other organizations engaged in the work of human betterment, including the American Association for the Advancement of Science itself, which at its recent meeting voted that hereafter the committee should represent not only the Economic Section in which it originated, but the entire association.—*The Outlook.*

BOTANICAL NOTES

A STUDY OF PHILIPPINE WOODS

IN the *Philippine Journal of Science* for October, 1907, Mr. F. W. Foxworthy publishes an interesting and very valuable paper on the structure, physical and chemical properties, uses, durability and botanical classification of the commercial woods of the Philippine Islands. The paper opens with a general and technical discussion of the gross morphology, the minute anatomy, color, odor, weight, seasoning, durability and uses, and this is followed by a key to the commercial woods, based upon structural characters of the woods themselves, and supplemented by photographic plates of fifty-five kinds. The names given are those which are used on the islands, and the kinds are arranged in the alphabetical order of the most widely used of these names. Thus the native name is given first, then are given in succession, the scientific name (with

occasional synonyms), the natural family, the several vernacular names, the distribution, properties of the wood, uses and structure. Sixty-eight kinds are described in this way, and these represent somewhat more than eighty species. For the most part these belong to families and genera but little known to the botanists of temperate climates, as *Pithecolobium, Parkia, Intsia, Pterocarpus, Sindora* and *Pahudia* of the *Leguminosae; Euphoria* and *Pometia* of *Sapindaceae; Koordersiodendron* and *Buchanania* of *Anacardiaceae; Sarcocephalus* and *Nauclea* of *Rubiaceae;* and such unfamiliar families as *Dipterocarpaceae, Combreaceae* and *Flacourtiaceae.*

The list enumerates dicotyledonous woods only, although the palms, bamboos and screw-pines yield poles, posts and other materials for structural work. Of the conifers, while several species are natives of the islands, they are so scattered or they occur in such inaccessible places in the mountains that they are practically unknown in the markets.

An interesting discussion is given of growth-rings, and we learn that they "seem to be characteristic of some of our woods only." "It also appears that many trees exhibit rings of seasonal growth when they are young, but not afterwards." We are told that a series of observations on the manner and rate of formation of growth-rings in tropical trees is now under way. We can not speak in too high praise of the kind of work done in the preparation of this paper.

THE SYSTEMATIC BOTANY OF THE LICHENS

TEN years ago Fünfstück began the volume dealing with the lichens in Engler and Prantl's "Natürlichen Pflanzenfamilien," and now we have the closing Lieferung with title-page and index. Including the index the volume covers 250 pages, and when bound will constitute one of the smaller books of the series. The illustrations, of which there are 125, are of the high order of excellence which we have come to expect in this publication.

It is estimated that there are about 4,000 species of lichens, nearly all of which belong to the subclass *Ascolichenes,* only seventeen belonging to the *Hymenolichenes.* The *Gasterolichenes,* indicated on page 49, are withdrawn on page 239, as the result of recent investigations. Throughout the volume the lichens are regarded as fungi in symbiosis with algae, in accordance with the prevailing views as to the nature of these organisms.

The general plan of classification adopted by Zahlbruckner, who wrote the systematic part, is as follows:

Subclass ASCOLICHENES,
- Order *Pyrenocarpeae,* with thirteen families, from *Moriolaceae* to *Verrucariaceae,* and *Mycoporaceae.*
- Order *Gymnocarpeae,*
  - Suborder *Coniocarpineae,* with three families, from *Caliciaceae* to *Sphaerophoraceae.*
  - Suborder *Graphidineae,* with five families, from *Arthoniaceae* to *Roccellaceae.*
  - Suborder *Cyclocarpineae,* with twenty families, among which are *Lecidiaceae, Cladoniaceae, Collemataceae, Peltigeraceae, Parmeliaceae, Usneaceae, Theloschistaceae, Physciaceae,* etc.

Subclass HYMENOLICHENES,
with but one family of three genera—*Cora, Corella* and *Dictynema.*

A valuable feature of the work is the indication under each family and genus of the nature of the particular algae ("gonidia") associated with the fungal symbiont.

STILL MORE SPECIES OF CRATAEGUS

THAT the description of additional forms of *Crataegus* under the name of "species" has not yet come to an end is shown quite emphatically by an article entitled "*Crataegus* in Southern Michigan," by Professor Sargent, in the Report of the Michigan Geological Survey for the year 1906. From material collected in two localities in the eastern part of the state, and one in the western, fifty-five species are described, twenty-five of which are new to science. Eighteen of the remaining thirty species are of recent separation by Ashe, mostly from one locality. We are told

that "Southern Michigan forms the western extension of what is perhaps the richest *Crataegus* region in the world." And further, "Judging from the material which I have seen from other parts of the lower peninsula and which is too incomplete for critical study, it seems probable that there are still a large number of unnamed species." With the prospect of seventy-five to eighty or more species of hawthorns in southern Michigan alone, the botanists of that state may confidently be expected to join the ranks of those who would restore the idea of species to its old significance.

Eventually most of these "species" will probably be sorted and arranged as interesting forms and varieties. As such they will be useful to the critical collector and field botanist. Possibly they may serve as examples of the "elementary species" of some recent writers, or of the "incipient" or "nascent" species of others. They are *not* the species of Gray, Torrey, Bentham, DeCandolle, or Linné.

CALIFORNIA COMPOSITES

IN marked contrast to the preceding paper is that of Mr. H. M. Hall, under the title of "Compositae of Southern California," in the University of California Publications (Vol. 3, No. 1, Dec. 28, 1907). The author, although dealing with about five hundred species, finds few new ones. The reason for this is suggested by the author's remark in the introductory chapter, where he says, "It should be noted that the number of species could be greatly augmented by recognizing numerous forms which have been described and given specific names, but which have been reduced to synonymy in this paper." A little later he gives his opinion "that the exaltation of trivial forms, distinguished only by one or two variable characters, to the rank of species is conducive neither to clearness nor to scientific accuracy." What he says further is so well said that it may be quoted with profit at this time when we are thinking seriously of the question of the nature and limits of species. "A rational system of classification should bring out the natural relationship between the various forms; should, in other words, represent the cleavage of the larger groups into their component parts as it has taken place in nature. Much of our recent work, however, has unfortunately consisted of a mere cutting across the grain, the result being a mass of chips—the so-called species—each being a purely artificial product and bearing no evident relationship to the others. This is commonly the result of hasty work where the perpetrator has been too busy to work out natural affinities through a comparison of intergrading forms accompanied by field study."

The Compositae of southern California as understood by the author are distributed by tribes as follows: *Eupatorieae,* 9 species; *Astereae,* 113; *Inuleae,* 25; *Ambrosieae,* 18; *Heliantheae,* 34; *Madieae,* 29; *Helenieae,* 86; *Anthemidieae,* 19; *Senecioneae,* 25; *Cynareae,* 17; *Mutisieae,* 2; *Cichorieae,* 68. These plants are distributed over six "life-zones," viz., Alpine, Hudsonian, Canadian, Transition, Upper Sonoran and Lower Sonoran, and the author discusses briefly the distribution of particular species in these zones. In passing we may notice that it is in the Transition zone that are found the extensive forests of yellow pine (*Pinus ponderosa*) and white fir (*Abies concolor*), while the Upper Sonoran zone "is essentially co-limital with the chaparrel belt." In looking over the list we observe that there are no species of either *Eupatorium* or *Lacinaria* (*Liatris*), and that there are of *Solidago* 4 species; *Aster,* 17; *Erigeron,* 14; *Ambrosia,* 2; *Franseria,* 8; *Xanthium,* 2; *Helianthus,* 6; *Senecio,* 11; *Carduus,* 6.

CHARLES E. BESSEY
THE UNIVERSITY OF NEBRASKA

THE AMERICAN NATURE-STUDY SOCIETY

THE American Nature-Study Society was organized at Chicago on January 2, 1908. Its purposes, as stated in the adopted constitution, are: (1) To promote critical investigation of all phases of nature-study (as distinguished from technical science) in schools, especially all studies of nature in elementary schools; and (2) to work for the establishment in schools of such nature-study as has

been demonstrated valuable and practicable for elementary education.

Its membership consists of teachers and others who are interested in nature-study for schools and whose applications for membership have been approved by the council. The annual membership fee is one dollar, payable before February 1, or upon election to membership in case of new members.

The council for 1908 consists of the following officers:

President—L. H. Bailey, Cornell University.

Vice-presidents—C. F. Hodge, Clark University; F. L. Stevens, North Carolina College of Agriculture; V. L. Kellogg, Stanford University; W. Lochhead, Macdonald College, Quebec; F. L. Charles, DeKalb (Ill.) Normal School.

Secretary-Treasurer—M. A. Bigelow, Teachers College, Columbia University.

Directors (for two years)—D. J. Crosby, U. S. Department of Agriculture; C. R. Mann, University of Chicago; S. Coulter, Purdue University; H. W. Fairbanks, Berkeley, Cal.; M. F. Guyer, University of Cincinnati; (for one year)—O. W. Caldwell, University of Chicago; G. H. Trafton, Passaic, N. J.; F. L. Clements, University of Minnesota; Ruth Marshall, University of Nebraska; C. R. Downing, Marquette (Mich.) Normal School.

The constitution adopted provides for an official monthly journal to be published under the direction of the council; and the well-established journal of nature-study, *The Nature-Study Review*, will be transferred to the society. The annual subscription price ($1.00) of this journal is included in the membership fee of the society ($1.00) provided that this fee is paid in advance; but subscribers to *The Review* are not enrolled as members of the society unless elected after filing application. For the purpose of stimulating local interest, sections of the society will be organized in various states and cities. Annual meetings will be held, usually in connection with the national scientific or educational societies. A directory of members will soon be published and revised annually.

The Chicago meeting was well attended by scientific men and dozens of others who were unable to be present expressed great interest in the movement. It is very important that at least one hundred fellows of the American Association for the Advancement of Science should be enrolled as members of the American Nature-Study Society. Their influence is greatly needed in the Nature-Study Society, directly, and indirectly, in establishing desirable relations with the American Association for the Advancement of Science.

For full information concerning the society, or in sending in applications for membership, address M. A. Bigelow, Secretary, Teachers College, New York City.

SCIENTIFIC NOTES AND NEWS

M. Henri Poincaré, the eminent mathematician, has been elected a member of the French Academy, in the place of the late M. Berthelot.

The Bruce gold medal of the Astronomical Society of the Pacific has been awarded to Professor Edward C. Pickering, director of Harvard College Observatory, for distinguished services to astronomy. This is the seventh award of the medal, the earlier medalists being Professor Simon Newcomb, Professor Arthur Auwers, Sir David Gill, Professor G. V. Schiaparelli, Sir William Huggins and the late Professor Hermann Carl Vogel.

The council of the Royal Society of Arts has awarded the gold medal of the Shaw trust for industrial hygiene to Professor W. Galloway, in recognition of his researches into the action of coal dust in colliery explosions.

M. Bouquet de la Grye has been elected president of the Bureau des Longitudes for 1908, M. Poincaré vice-president and M. Bigourdan secretary.

Dr. C. Chree, F.R.S., has been elected president of the Physical Society of London.

The University of Edinburgh purposes to confer its doctorate of laws on Sir Norman Lockyer, director of the Solar Physics Observatory, South Kensington, and editor of *Nature*.

The jubilee of Calcutta University will be celebrated on March 14, when the degree of doctor of science will be conferred as follows:

The Hon. Dr. Justice Mukerjee, vice-chancellor of the Calcutta University; Professor A. Schüster, F.R.S.; the Rev. Father E. Lafont, S.J., C.I.E., late rector of St. Xavier's College, Calcutta; Mr. T. H. Holland, F.R.S., director of the Geological Survey of India; Dr. G. Thibaut, C.I.E.

MR. NORMAN TAYLOR, who has been an aid in the New York Botanical Garden for several years, has been appointed custodian of the plantations.

MR. BENJAMIN KIDD has been appointed to deliver the Herbert Spencer lecture for 1908 before the University of Oxford in May or June next. Three lectures have already been given, namely, in 1905 by Mr. Frederic Harrison, in 1906 by Mr. Auberon Herbert and in 1907 by Mr. Francis Galton, F.R.S.

AT the Royal Institution on March 7, Professor J. J. Thomson, of Cambridge University, gave the first of six lectures on "Electric Discharges through Gases."

PROFESSOR HANS GADOW, of the University of Cambridge, England, will give a series of six illustrated lectures at the University of Illinois from March 16 to 21. The general subject of the lectures will be "Coloration of Amphibians, Reptiles and Birds."

THE anniversary meeting of the Geological Society of London was held on February 21, when officers were elected as follows: President, Professor W. J. Sollas, F.R.S.; vice-presidents, Mr. Frederick W. Rudler, I.S.O., Dr. Aubrey Strahan, F.R.S., Dr. J. J. H. Teall, F.R.S., and Dr. A. Smith Woodward, F.R.S.; secretaries, Professor E. J. Garwood and Professor W. W. Watts, F.R.S.; foreign secretary, Sir Archibald Geikie, F.R.S.; treasurer, Mr. Horace W. Monckton, F.L.S. The following awards of medals and funds were made in accordance with the announcement already made: The Wollaston medal to Professor Paul von Groth, of Munich; the Murchison medal to Professor A. C. Seward; the Lyell medal to Mr. Richard Dixon Oldham; the Wollaston fund to Mr. H. H. Thomas; the Murchison fund to Miss Ethel G. Skeat; and the Lyell fund to Mr. H. J. Osborne White and Mr. T. F. Sibly.

THE second in the series of university lectures at Western Reserve University was given by President Charles Sumner Howe, of the Case School of Applied Science, on March 3. President Howe's subject was "The more recent developments in astronomy."

ON the evening of March 6, Professor George B. Shattuck, of Vassar College, lectured before the Stamford Scientific Society on "A Cruise in the West Indies."

DR. LEROY MCMASTER, of Washington University, gave a lecture on the "Detection of Ozone, Nitrogen Peroxide and Hydrogen Peroxide in Gas Mixtures" at the monthly meeting of the St. Louis Section of the American Chemical Society, held on February 10 at the Academy of Science building, St. Louis.

HARVARD UNIVERSITY has received $9,753.64, representing the subscriptions of sixty-two friends of the late Professor Charles Follen Folsom, of the Medical School. At the desire of the subscribers the money is to be used to found in the medical school a teaching fellowship in hygiene or mental diseases, the incumbent to receive the income of the fund. Additional subscriptions not yet paid in will increase the fund by $1,430 within the next year. Professor Folsom graduated from the university in 1862 and until 1885 was a teacher in various capacities in the medical school. From 1891 to 1903 he was a member of the board of overseers.

AT the commemoration day exercises of Johns Hopkins University, on February 22, a portrait of Henry Newell Martin, formerly professor of biology, was presented to the university by his old students. The presentation speech was made by Dr. William H. Howell, dean of the medical school.

DR. D. B. ST. JOHN ROOSA, president of the Post-graduate Medical School of New York City, known for his work on diseases of the eye and ear, died on March 8, at the age of seventy years.

MR. W. A. SHENSTONE, F.R.S., senior science master at Clifton College, known for his researches in chemistry, has died at the age of fifty-eight years.

Professor Ivan Stožir, founder and formerly director of the Royal Meteorological Observatory at Agram, Hungary, died on February 12.

A conference of imperial and colonial meteorologists has been convened by the Royal Society of Canada, to meet at Ottawa in May.

The Prehistoric Society of France will hold its annual meeting at Chambéry from August 24 to 30.

The Second Congress of the American School Hygiene Association will convene in Atlantic City, New Jersey, on April 17 and 18, 1908. A program is being prepared which includes papers on legislation relative to school hygiene; medical and sanitary inspection of schools and school children; treatment following the medical inspection of school children; nursing systems in public schools; and other subjects of allied nature. Papers have been promised by Dr. Martin Friedrich, health officer, Cleveland, Ohio; Dr. John J. Cronin, assistant chief medical inspector, New York City; Dr. C. Ward Crampton, assistant physical director, public schools, New York City; Joseph P. Chamberlain, lawyer, San Francisco; R. C. Sturgis, chairman, schoolhouse committee, Boston; Dr. Adolf Meyer, director Pathological Institute, State Commission in Lunacy, New York; Dr. Henry D. Holton, secretary, State Board of Health, Vermont; Dr. George L. Meylan, adjunct professor of physical education, Columbia University; Joseph Lee, Boston; A. C. Vandiveer, counsel, Medical Society, County of New York; Dr. Charles Harrington, secretary, Massachusetts State Board of Health; Samuel G. Dixon, commissioner of health, Harrisburg, Pennsylvania; Dr. Myles Standish, professor of ophthalmology, Harvard Medical School, and Hon. Curtis Guild, Jr., governor of Massachusetts.

According to *Terrestrial Magnetism and Atmospheric Electricity* the superintendent of the Coast and Geodetic Survey has decided to continue the operation of the magnetic observatory at Baldwin, Kansas, which it had been the intention to discontinue at the end of the year 1907. On account of the usefulness and the needs of continuous magnetic records in this region of the United States it is proposed now to continue the Baldwin observatory until it is possible to construct and establish another observatory in its place somewhere west of the Mississippi River.

We learn from the *Journal of the American Medical Association* that a delegation of 200 members of the Medico-Chirurgical Faculty of Maryland was given a public hearing on February 12 by the legislature at Annapolis, to urge the passage of the bill asking for an appropriation of $100,000 for the erection of a public-health institution and medical library building in Baltimore. Speeches were made in favor of the bill by Drs. Charles O'Donovan, president of the faculty; William H. Welch, of Johns Hopkins Medical School; Edward N. Brush, superintendent of Sheppard and Enoch Pratt Hospital, Towson, and Dr. Clotworthy Birnie, Taneytown, formerly a member of the legislature.

The twenty-first annual exhibition by the department of microscopy of the Brooklyn Institute of Arts and Sciences will be held on Saturday evening, March 14, 1908, at the galleries of the Art Building, 174 Montague Street, from 7:45 to 11 o'clock. It will include a display of objects viewed with the microscope, also apparatus, photomicrographs, lantern slides of microscopic objects and other matter pertaining to microscopy. Admission is by ticket, which may be secured by application at the office of the institute or of the president of the department, J. J. Schoonhonn, 34 Second Place, Brooklyn, N. Y.

The University of Washington will send a botanical field party to Alaska during the present summer under the direction of Dr. T. C. Frye, of the department of botany. The general plan is to leave Seattle about July 1, and go as far north as Skagway. From the chief cities as a base excursions will be made into the mountains, to glaciers, to mines and along the sea shore. The work will close in Alaska six weeks from date of sailing from Seattle. The expense will be $20 incidental fee, about $70 steamer fare, and the living expenses which are estimated at $80 for the

six weeks, making the total about $175. The work will be the collection of Alaskan plants, the study of adaptation to environment from seashore to perpetual snow, and from fresh water to dry rock. Lectures will be given on plant ecology, with occasional talks on other subjects.

THE University of Washington will open its marine station at Friday Harbor, Washington, for the fifth annual session, on June 22, 1908. The length of the session will be six weeks. The staff will consist of Dr. Charles W. Prentiss, of the department of zoology of the University of Washington, Dr. Robert B. Wylie, of the department of botany of the University of Iowa, and Professor Charles O. Chambers, of Pacific University, Forest Grove, Oregon. The chief features of the station are its location in the heart of an evergreen forest in the winter rain belt, the abundance of marine plants and animals, its constant use of the dredge, and its low fees.

THE Physics Club of New York at its regular meeting, held March 7, 1908, unanimously adopted the following resolution:

Resolved, That a uniform course in physics for all schools is both undesirable and unattainable. We therefore recommend:

1. That syllabuses should deal with the barest outline of general principles, leaving each teacher free to fill up the course according to his best judgment.

2. That examinations for college entrance should be confined to the general principles specified in the syllabus, and that a teacher's certificate should be accepted for other material—this might well take the form of a rather full statement of the work done.

VOLUME VI., No. 1, of the University of California Publications in American Archeology and Ethnology is by S. A. Barrett on "Ethno-geography of the Pomo and Neighboring Indians." It is intended both as a background and preliminary for future studies of the ethnology of the Pomo Indians of California, and as the first of a series of investigations describing the territorial limits, tribes of villages, and internal dialectic divisions of each of the groups or families of Indians in California. Besides the Pomo, the paper treats of the contiguous families between San Francisco Bay and latitude 40, the Pacific Ocean and the Sacramento River. The author finds seven markedly distinct dialects among the Pomo, and at least as many more among the other families in the territory considered. The degree of affinity and difference between these dialects is shown in vocabularies of about three hundred words, which are superior to any previously existing material of the same kind, not only in representing all forms of speech in the region, but in being collected by one observer according to the same method. The boundaries of the territory of the Pomo and the other families, and of each dialect, are described in detail and shown on a large map. Tribes in the ordinary sense of the word are declared to have been wanting, the only political unit having been the small village. Of such villages several hundred are listed, each given under its native name and located as exactly as possible. The Pomo territory was not extensive, but included several regions of quite different environments, such as the coast, the Clear Lake region, the open valleys, and the timbered mountain ranges. The effect of these varying environments on the mode of life and customs of what must at one time have been the same people, as proved by language, is fully discussed.

IN the House of Commons on February 17, as we learn from *Nature*, Mr. Mallet asked the secretary of state for war whether he was aware of the public service rendered by a commission of the Royal Society, at the request of the war office and the admiralty, in discovering the cause of Malta fever, from which many hundreds annually of our soldiers and sailors on that island until recently suffered; and whether, in view of the importance of this discovery in the annals of preventive medicine, inasmuch as at the present moment the disease had been entirely stamped out, he would consider the desirability of giving the thanks of the government to the Royal Society for this instance of the successful application of British scientific research? In his reply to this question Mr. Haldane said: "I am aware of the great service rendered by the commission in question. The commission's

investigations and the adoption of preventive measures as the outcome of its recommendations have been followed by the practical disappearance of Malta fever from the garrison of the island. I think that the Royal Society is well aware how genuine is the appreciation of the government. We owe much to the Royal Society's commission for the successful issue of this remarkable investigation, and for the excellent results which have followed. These results illustrate the enormous importance of bringing science into our business of government."

THE coal purchases of the United States government aggregate in value nearly $6,300,000 annually, and it became apparent some time ago that a more uniform basis for buying coal was urgently needed. Until after the establishment of the fuel-testing plant of the United States Geological Survey at St. Louis, in 1904, reliable information in regard to the character of the coals of the United States was difficult to obtain. Coal has been purchased by the government, as well as by the general public, on the mere statement of the selling agent as to its quality or on the reputation of the mine or district from which it was obtained; and if it did not prove to be satisfactory there was no standard for settlement or justification for canceling the contract. If a consumer thought he had cause to find fault with the quality of the fuel he received he was in many cases assured that it must be good because, like all the other coal sent him, it came from a mine with an established reputation. All the other products of mines—gold, silver, copper, and even lead, zinc and iron ores—are purchased to a great extent on the basis of their value as shown by chemical analysis; of coal this is now true only in a small degree, but the number of contracts made on this basis is increasing from year to year. The United States Geological Survey has been charged with the duty of analyzing and testing the coals used by the government, and a summary of the information on this subject obtained to date, including samples of the specifications for coal contracts that are now in use and analyses of some of the coals purchased during the winter of 1906–7, prepared by Mr. D. T. Randall, has just been published as Bulletin No. 339. This bulletin is distributed free of charge and may be obtained on application to the director of the survey at Washington, D. C. Samples of the specifications used by many of the large commercial consumers of coal are also given.

PORTO RICO will soon have its only national forest under administration. Mr. M. Rothkugel, of the United States Forest Service, has sailed from New York for the island to make a study of forest conditions and outline a plan of management of the Loquillo National Forest. The Loquillo is the only national forest in the insular possessions of the United States, and, while it was created in 1903, provisions for its administration were not made until early in January, when the comptroller of the treasury affirmed the jurisdiction of the Department of Agriculture over the forest. The forest takes in a little less than 66,000 acres and is located in the northeastern part of the island. Mr. Rothkugel, on reaching Porto Rico, will confer with Governor Post, and will spend three months studying conditions and making his plans and will report to Forester Gifford Pinchot. While in Porto Rico he will select and appoint native rangers, picking men who have a thorough knowledge of forest conditions in Porto Rico.

THE people of Ireland pay $5,000,000 a year for the timber which is imported from other countries. This is the penalty of failure to protect its forests. Ireland has only 1½ per cent. of its land in timber and much of that small area is covered with scrub growth of little value. At the same time 23 per cent. of the island is uncultivated. Few inhabited countries have been so extensively deforested. The work of changing conditions for the better has been entered upon however, and scientific forestry will be applied. Consul General Alfred K. Moe, of Dublin, Ireland, reports the progress that has been made looking to the preservation of the few remaining forests and the reforestation of vast areas. The Irish Department of Agriculture maintains a forest school at Avondale which will have charge

of the tree planting. A special study has been made of Lord Fitzwilliam's estate which was planted to timber fifty years ago. A popular objection to reforestation in Ireland has been that forest plantations offer less employment to labor than equal areas of agricultural land. It was shown, however, that Lord Fitzwilliam's forest, although planted on poor soil, not valuable for agriculture, had employed four times as much labor as has been employed upon the agricultural land and was more profitable to the owner. Within the past year timber to the value of $50,000 has been sold, and much remains to be cut.

ACCORDING to Consul-general William H. Michael, of Calcutta, it is proposed by the British India government to link the five rivers—the Indus, Jelum, Chenab, Beas, Ravi and Sutlej—together in such manner as to equalize the flow of water when one river or more is in flood and thus supply the whole canal system connected with these rivers. Mr. Michael continues: "By this arrangement the Punjab (the meaning of Punjab is five rivers) will be given a water supply for irrigation sufficient at all times. The decision of the government of India to adopt the northern alignment for the Sind-Bombay connection railroad, partly on military grounds and partly owing to the objections raised by the Rao of Cutch to the southern alignment, puts an end, for the present at least, to cooperation between the irrigation department and the railway company, which was expected to effect great benefit in that part of the Punjab through which the lines would have run. In time, when the great irrigation projects in the Punjab, now in course of construction, shall have been completed, the irrigation department will take up the scheme of drawing and rendering fit for cultivation the lowlands and salt marshes which make up what is known as the Runn of Cutch. It is claimed that the irrigation department has work in hand on plans that have been adopted to engage its time, energies and available capital for thirty years.

THE collection of anthropoid apes in the Regent's Park Gardens is, says the London *Times*, the finest ever brought together. Within the last few days it has been further increased by the kindness of Dr. J. C. Graham, who has presented a fine orang (*Simia satyrus*), probably about six years old. The animal, which has been a pet, is in good condition, and already on friendly terms with its keeper, whose experiences with anthropoids goes back to the arrival of the first gorilla in 1887 and the experiments of Professor Romanes in teaching Sally, the famous chimpanzee, to count. Jacob, as the new arrival was called by its former owner, is not as yet on exhibition, but is kept in the basement, owing to want of room in the upper hall, which contains only four large cages, though their division has been discussed. Although somewhat upset by the process of transfer from the traveling box to the temporary cage, he soon resigned himself to the new surroundings, and feeds well. He has for a near neighbor Delia, a young orang presented by Dr. Graham in 1905, and well known to visitors from its being taken out to exercise in fine weather by the keepers. The name Delia is not in this case feminine, as one might be inclined to consider it, but geographical, having reference to the district of Deli, in the northeast of Sumatra. In the hall is Sandy, the very fine orang presented by Dr. Ridley, which arrived early in September, 1905, and had lived for seven years in the Botanical Gardens at Singapore. In addition to these orangs the society possesses nearly a dozen chimpanzees and four gibbons.

UNIVERSITY AND EDUCATIONAL NEWS

HARVARD UNIVERSITY has received $25,000 from Mr. Larz Anderson, '88, of Brookline, and Mrs. Anderson, for the building fund of the Dental School. Work on the new building will be begun very shortly.

AT the inauguration on March 4 of Dr. Edward Dwight Eaton as president of Beloit College, he announced that Mr. Andrew Carnegie had given the institution $50,000 to insure the gift of $150,000 from the general educational board, and to endow a chair of political economy and finance.

BY the will of Mrs. Louisa S. Baker, bequests of $6,000 and $4,000 are made to the Massachusetts Agricultural College and Am-

herst College, respectively, the income of which funds should be used to help deserving students.

Dr. J. W. H. Traill, professor of botany, Aberdeen University, has given to the university £1,000, to found a bursary for science students.

Bowne Hall of Chemistry, erected for Syracuse University by Mr. Samuel W. Bowne, of New York, at a cost of $200,000, was opened last week.

At a meeting of the trustees of Columbia University on March 2, the budget for 1908–9 was passed. The total appropriation is $1,552,563.79. $1,138,992.79 is set apart for educational administration and instruction, $176,630 for the care of the buildings and grounds, $71,479 for the library, $29,312 for the business administration of the corporation, $47,420 for annuities and $88,730 for interest on the debt.

According to the New York *Evening Post* McGill University has received from the insurance companies in connection with the fires in the engineering and medical buildings $636,000. The cost of the new engineering building, together with the additions to the Workman building, are estimated at $572,000. It is estimated that the new medical building will cost from $500,000 to $600,000.

The presidents of the nine colleges and universities of Wisconsin met recently at the University of Wisconsin upon invitation of President Charles R. Van Hise, and organized the Association of Colleges and Universities of Wisconsin. President Van Hise was elected president, and President R. C. Hughes, of Ripon College, was chosen secretary. The chief topic of discussion was the scope of academic work in relation to university, graduate and professional courses. It was decided that each institution should give instruction only in those fields in which it was adequately equipped to do the work well. The several institutions represented agreed to cooperate to the fullest possible extent in advancing the higher educational interests of the state.

At the meeting of the council of the University of Paris on February 24 the vice-rector presented to that body a loving cup, a gift made by the University of London to the University of Paris as a souvenir of the hospitality it received last summer. The cup is silver-gilt, repoussé and chisseled, and is nearly three feet high. The lid is surmounted by an allegorical figure, while the body of the cup bears on its outside the arms of the Universities of Paris and London, two escutcheons emblematic of the French Republic and Great Britain, and three figures symbolic of science, letters and art. The cup was designed and executed by Messrs. Ramsden and Carr.

At the Johns Hopkins University, Dr. John B. Watson has been appointed professor of experimental and comparative psychology, and Dr. Edward F. Buchner, professor of education and philosophy. Dr. Watson succeeds Professor George M. Stratton, who has been called to the University of California. He is a graduate of Furman University, S. C., and received the degree of doctor of philosophy from the University of Chicago in 1903. He has since been an instructor in that institution and now holds the position of assistant professor of experimental psychology. Dr. Buchner received his doctor's degree from Yale University in 1903, and until 1897 held a position there as lecturer and instructor. He has since been professor of analytical psychology in New York University and professor of philosophy and education in the University of Alabama.

Promotions at Columbia University, to take effect on July 1, are as follows: From instructor to adjunct professor, Dr. S. Alfred Mitchell, astronomy; Dr. Carlton C. Curtis, botany; E. L. Kurtz, mining. From adjunct professor to professor, Dr. William R. Shepherd and Dr. James T. Shotwell, history; Henry B. Mitchell, mathematics; Charles E. Lucke and Walter Rautenstrauch, mechanical engineering.

At the College of the City of New York, appointments have been made as follows: John P. Turner, of Vanderbilt University, tutor in mathematics; William S. Lord, of the University of Maine, tutor in mathematics; Dr. Robert Boyd, of the College of Physicians and Surgeons, instructor in vertebrate zoology.